

## Historic, archived document

Do not assume content reflects current  
scientific knowledge, policies, or practices



61-TP-3  
ILLUSTRATIONS

THE GYPSY MOTH  
AND THE  
BROWN-TAIL MOTH

A HISTORY OF THE WORK FOR  
PREVENTION OF SPREAD AND  
EXTERMINATION OF THESE INSECTS  
IN NORTH AMERICA

BY

A. F. BURGESS

MADE BY  
LOOSE WILSON JONES LEAF  
U. S. A.  
EX 58078

PROPERTY OF:

Bioenvironmental Bee Laboratory  
Bldg. 476, BARC-East  
Beltsville, Maryland 20705



*L. O. Howard*



*Mr. R. Sessions*



*C. H. Fernald*



*E. H. Fortbush*



*A. H. Kirkland*

# THE PIONEERS



The Gypsy Moth  
*Porthetria dispar* Linnaeus



Plate II. Upper left, egg clusters on tree; upper right, larvae; lower left, pupae; lower right, moths.





Plate III. The Trouvelot house,  
Myrtle Street, Medford, Mass., 1895.

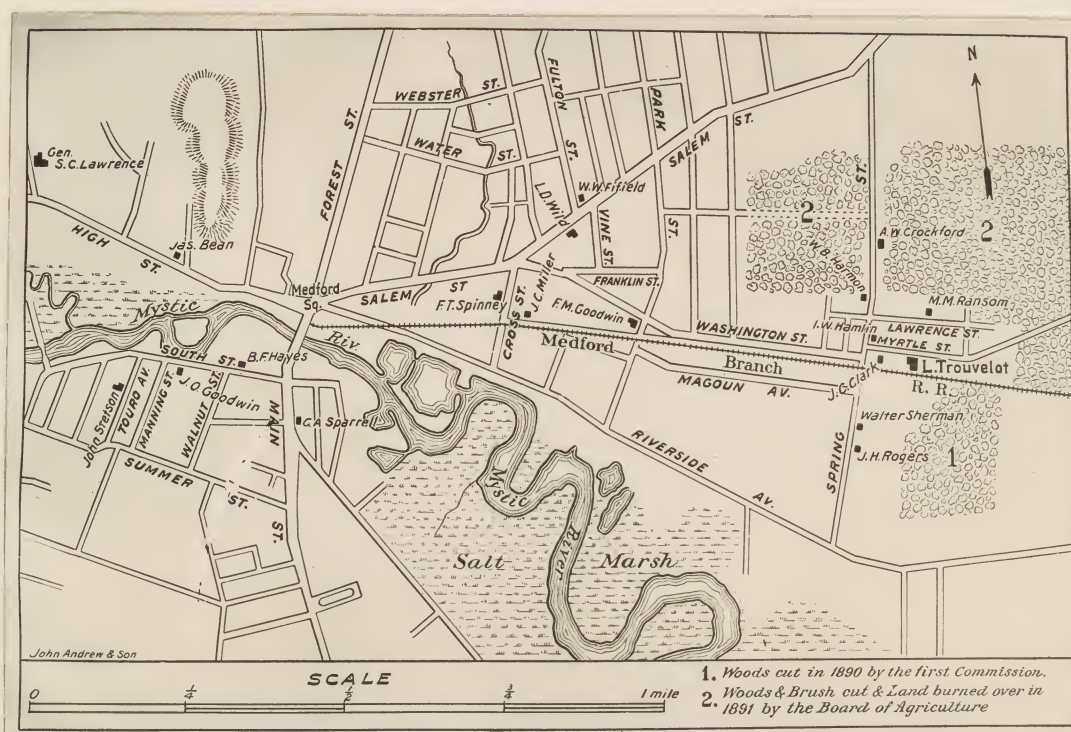


Plate IIIa. Map of Medford, Mass., showing  
where outbreak of gypsy moth occurred in 1889.





Plate IV. Apple trees twice sprayed with Paris green and afterwards stripped by the gypsy moth, 1891.



Plate IVa. Woodland twice sprayed with Paris green and afterwards stripped by the gypsy moth, 1891.





Plate V. Trees stripped by the feeding  
of gypsy moth caterpillars, 1891.



Plate Va. Woodland defoliated by the gypsy moth, 1891.





Plate VI. Applying burlap bands, 1891.

p. 125

p. 37



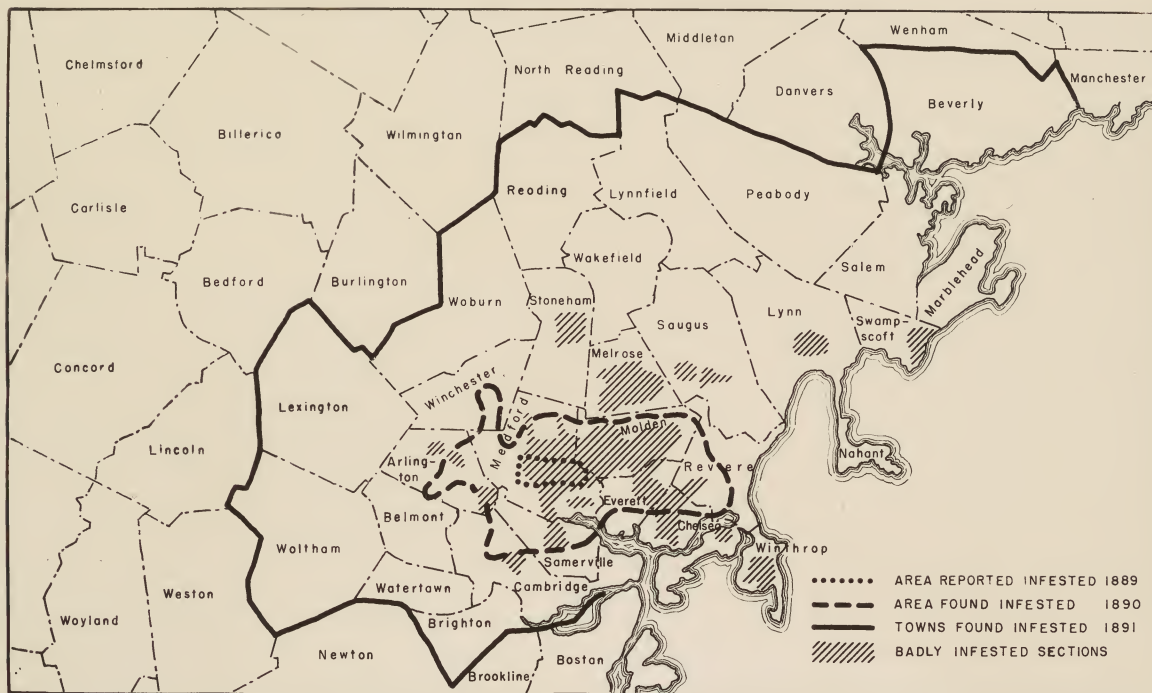


Plate VII. Map of infested territory, 1889, 1890, and as actually determined by Massachusetts Board of Agriculture, 1891.



Plate VIIa. "Shaw" moth trap, 1894.





Plate VIII. Defoliated woodland, in distance, showing appearance in contrast to normal foliage in foreground, 1895.



Plate VIIIa. Close-up view of defoliated woodland, 1895.





Plate IX. Insectary at Malden, Mass. Erected  
by State Board of Agriculture, 1895.





Plate X. Dexter Elm, Malden, Mass. Men at work searching for and destroying gypsy moth egg clusters. 1892.



Plate Xa. Removal of Dexter elm, 1915. This tree, according to records, was planted in 1666. The bark was 3 inches thick at the butt and the largest annual growth took place the first 18 years of its life.

P. 60



The Brown-Tail Moth, *Nygmia phaeorrhoea* Donovan



Plate XI. Upper left, winter webs on twigs of trees; upper right, individual web; lower left to right, egg clusters on underside of leaf, larvae, pupae, moths.



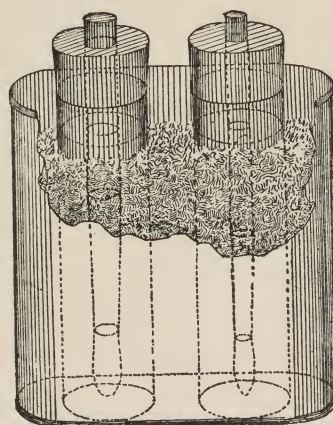


Figure 1. Paint and creosote can, 1892.

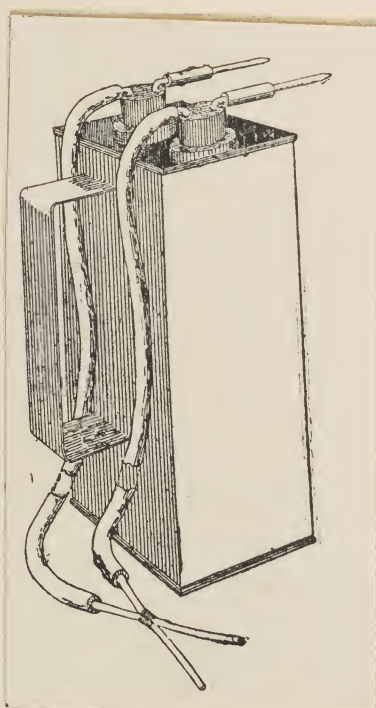


Figure 2.  
Acid dispensing  
Apparatus  
1891  
(Obsolete)

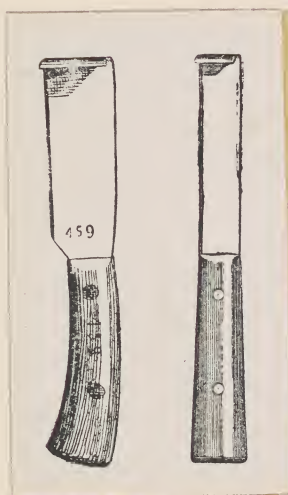


Figure 3.  
Bark knives

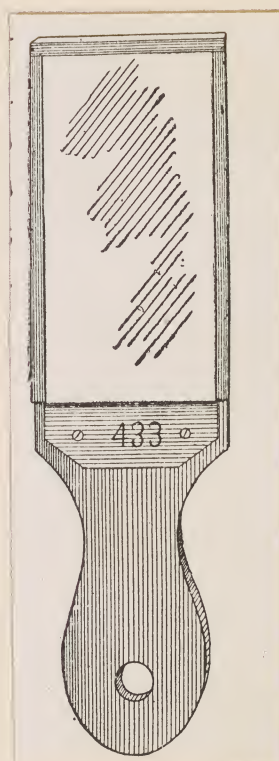


Figure 4.  
Hand Mirror

Plate XII. Implements used for scouting and treatment  
of egg clusters.



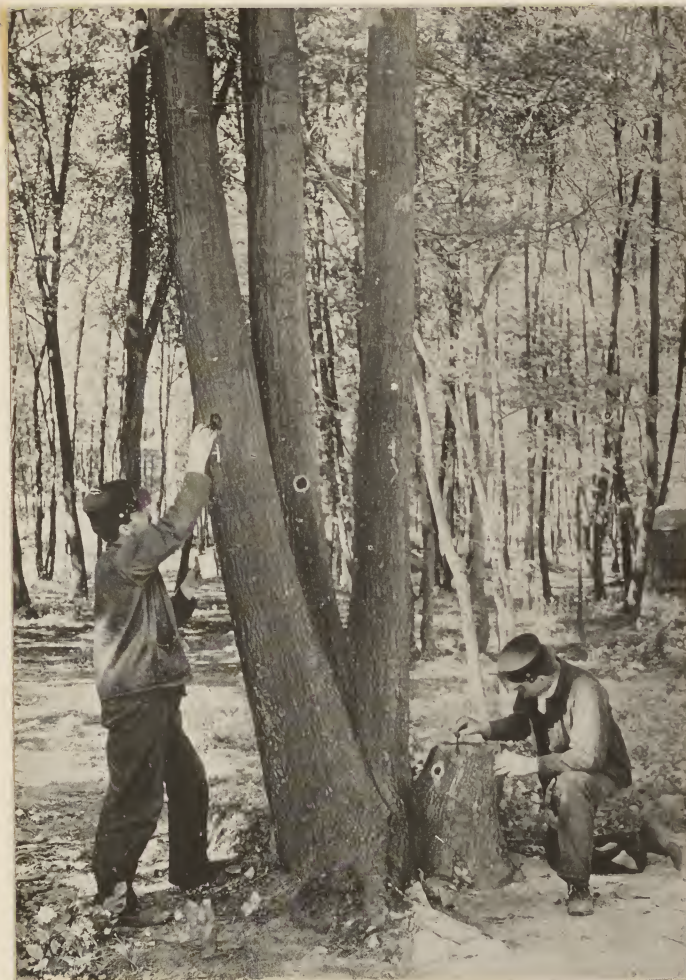


Plate XIII. Treating egg clusters  
with creosote, showing paint-  
ringed clusters and tree marks  
indicating infestation, 1892.

pl. 134





Plate XIV. "Cyclone burner", used in burning out egg clusters and caterpillars in stonewall, 1892.



Plate XIVa. "Cyclone burner", used for burning young caterpillars in infested brushland.





Plate XV. Burlap cutting machine, 1898.

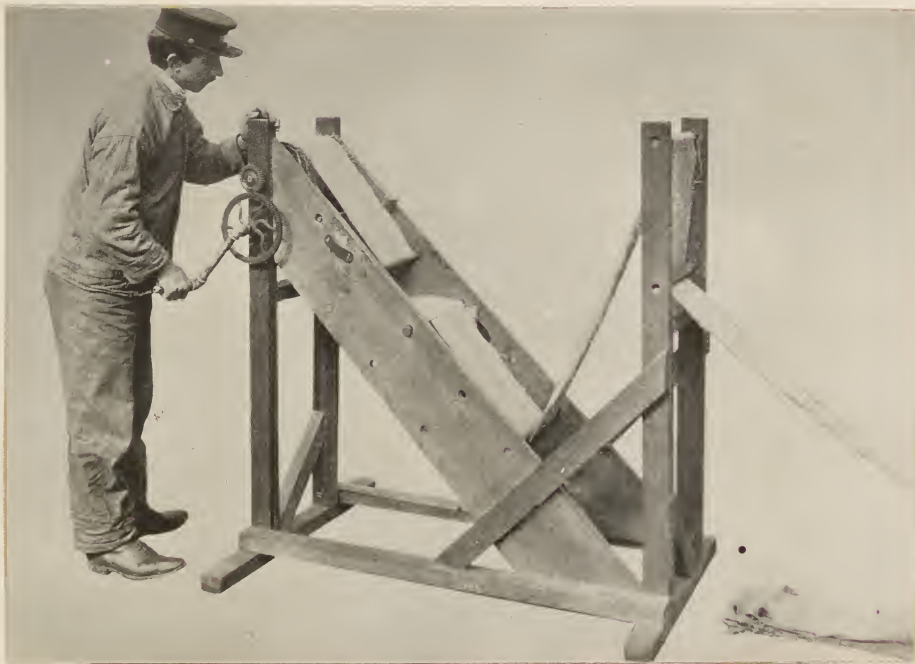


Plate XVa. Machine for rolling burlap, 1898.



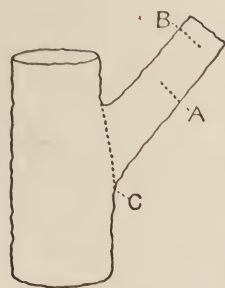


FIG. 1.



FIG. 2.



FIG. 3.



FIG. 4.



FIG. 5.



FIG. 6.



FIG. 7.



FIG. 8.



FIG. 9.

Fig. 1. Proper method of removing a large branch. Fig. 2. Branch broken down from cut wrongly made. Fig. 3. Dead stub left to rot back. Fig. 4. Stump of branch left by bad pruning. Fig. 5. Same, three years later. Fig. 6. Decay resulting from bad pruning. Fig. 7. Cemented cavity. Fig. 8. Tinned cavity. Fig. 9. Bur-lapped cavity.

**Plate XVI. Methods for pruning trees and filling cavities.**





Plate XVII. Hogshead with hand pump  
for spraying from wagon, 1891.

1008





Plate XVIII. Improved "giant, automatic power sprayer", 1895.



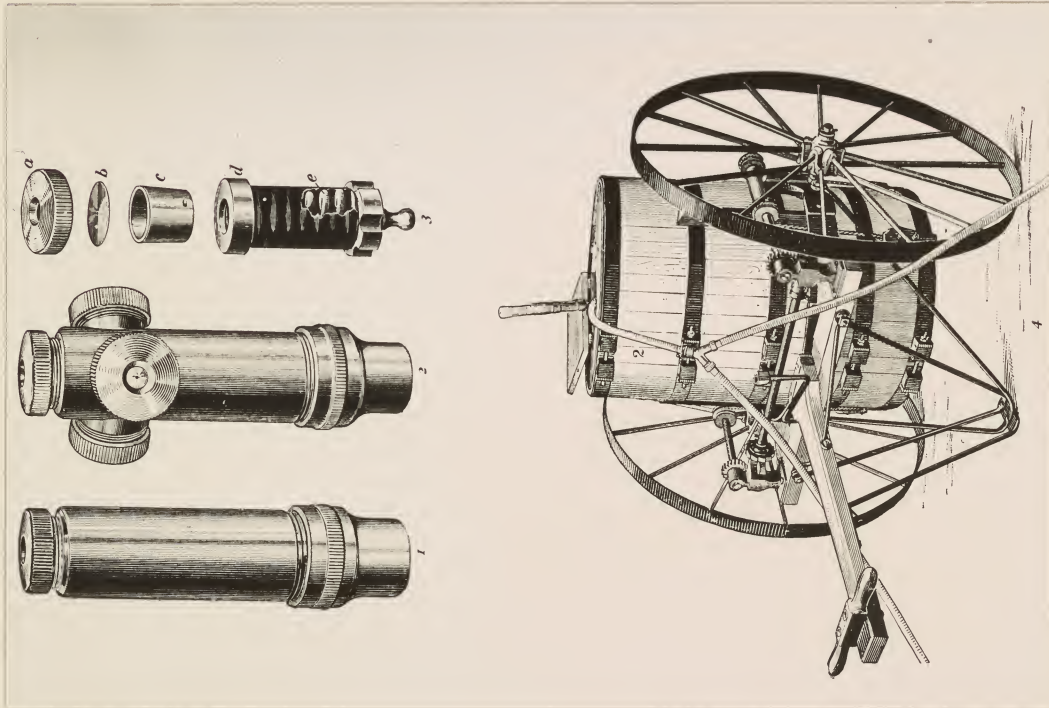
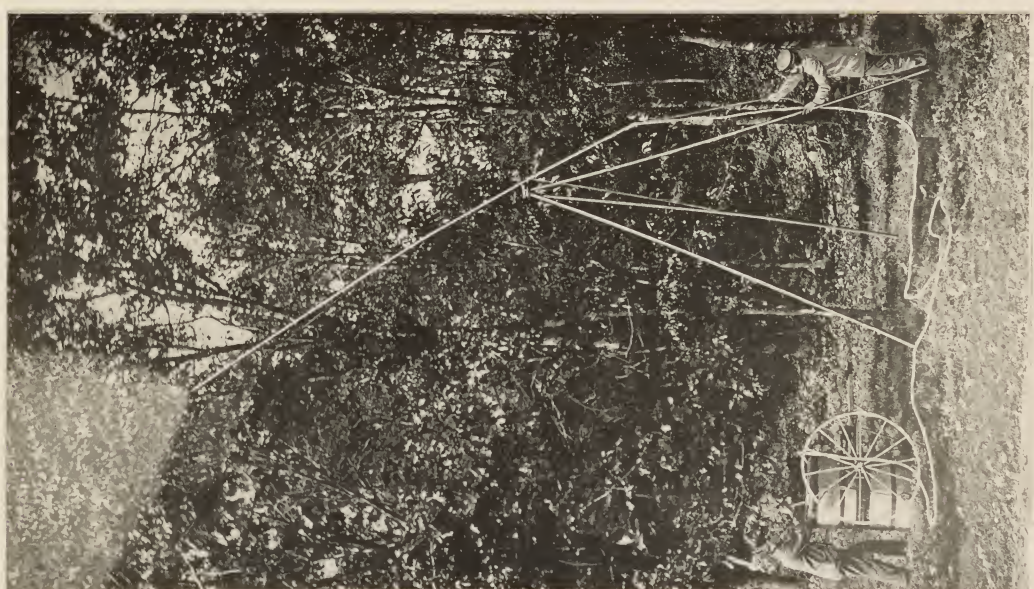


Plate XIX. Improved nozzles and sprayer, 1898.



XIXa. Improved spraying apparatus with tripod extension pole, 1898.





Plate XX. Area in vicinity of Boston, Mass., showing sections infested by the gypsy moth, 1904.

### STATE OF MASSACHUSETTS GYPSY MOTH WORK 1890 - 1904

APPROPRIATIONS REQUESTED  
APPROPRIATIONS GRANTED  
ESTIMATED AMOUNT EXPENDED

BY THE PUBLIC - SEE U.S.  
BUR. OF ENT. CIRCULAR NO. 58

--- PROF. FERNALD'S 15 YR. PLAN  
RECOMMENDED, BEGINNING 1897  
\$200,000 PER. YR. FOR 5 YRS.  
\$100,000 " " NEXT 5 YRS.  
\$15,000 " " FINAL 5 YRS

\* 10,000 SPENT ON BROWN-TAIL MOTH WORK 1898 & 1899

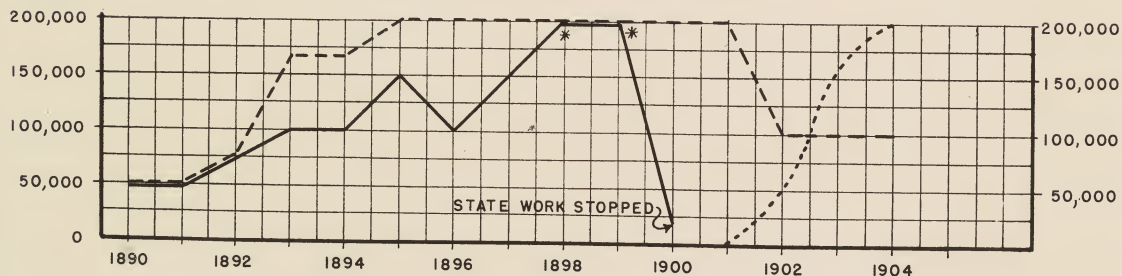


Plate XXa.

170





Plate XXVII. Bureau Gypsy Moth office, 962 Main St.,  
Melrose Highlands, Mass.



Plate XXVIIa. Bureau Gypsy Moth laboratory,  
17 E. Highland Ave., Melrose Highlands, Mass.



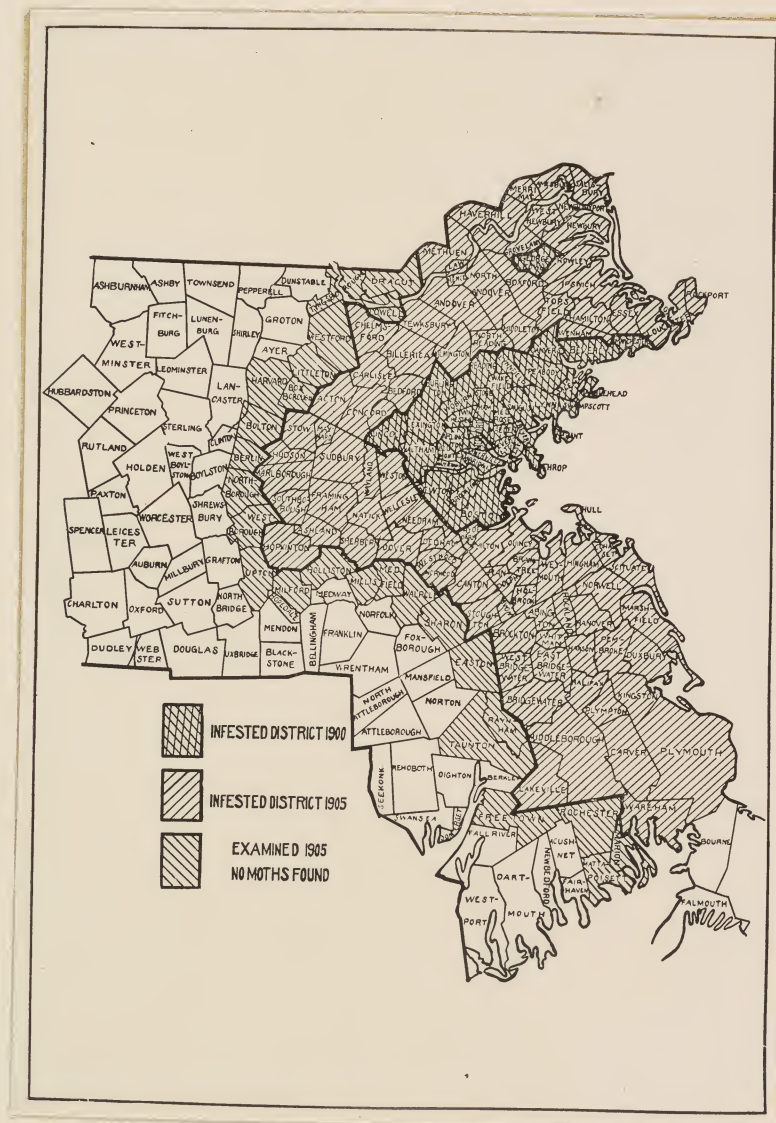


Plate XXI. Area infested by the gypsy moth, 1900 and 1905.





Plate XXV. Areas sprayed and unsprayed  
in North Shore woodland.

p. 212



Plate XXVa. Roadside trees protected by town  
spraying, Taunton, Mass., 1936.



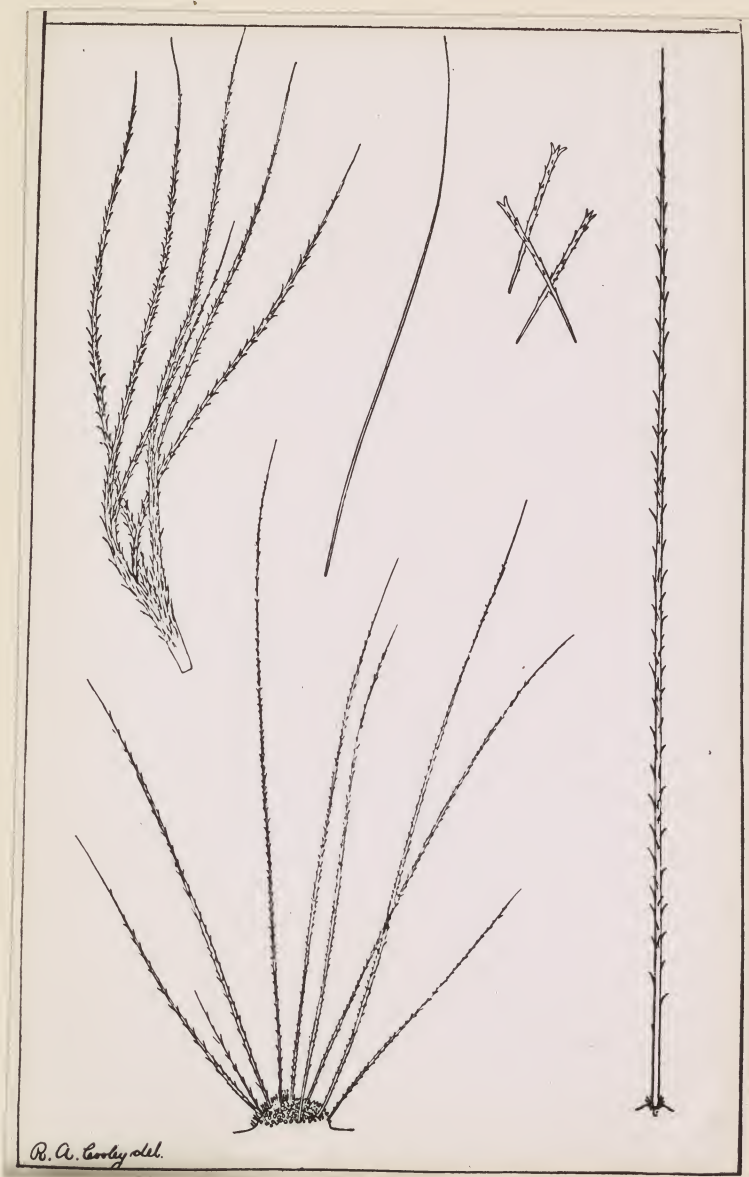


Plate XXIV. Various forms of hairs on  
brown-tail moth caterpillar.

p. 81, 190





Plate XXIII. State laboratory at  
North Saugus, Massachusetts, 1905.



From top to bottom:

E. G. Titus

F. H. Mosher

R. L. Webster

H. M. Russell

Orton L. Clark

Unknown

C. C. Gowdey

Plate XXIIIa. Group of  
laboratory workers, 1906.

1905



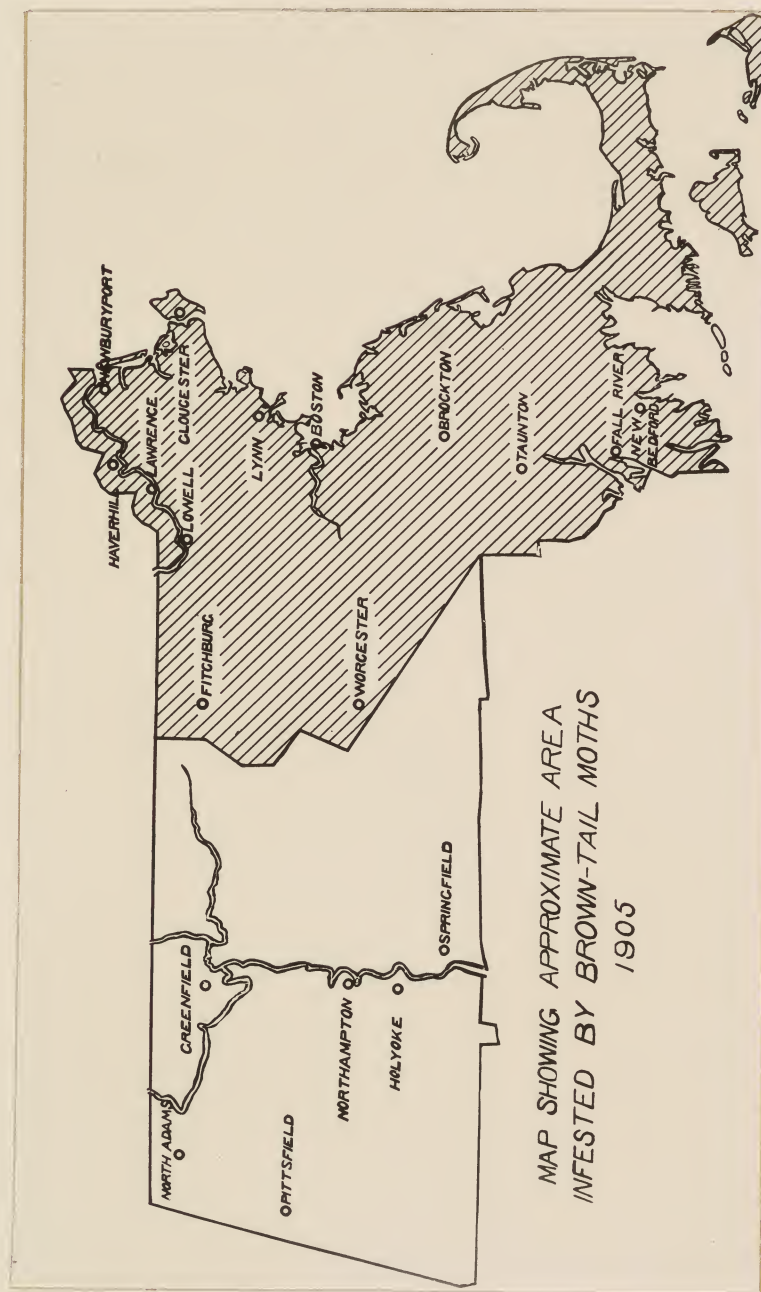
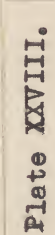


Plate XXII. Area in Massachusetts infested by the brown-tail moth, 1905.



2. 72





# **WARNING**

---

The trees and shrubs  
on this property have been  
sprayed with

# **Arsenical POISON**

**Do Not Allow Animals to Graze**

---

**U. S. Department of Agriculture**

**BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE  
GYPSY AND BROWN-TAIL MOTHS CONTROL**

**20 Sanderson Street, Greenfield, Mass.**

U. S. GOVERNMENT PRINTING OFFICE 16-12750

XXVIIIa. Poster used for  
warning at sprayed area.





Plate XXIX. The Wilt Disease of the Gypsy Moth. Note the typical way caterpillars hang when affected by this disease.

266

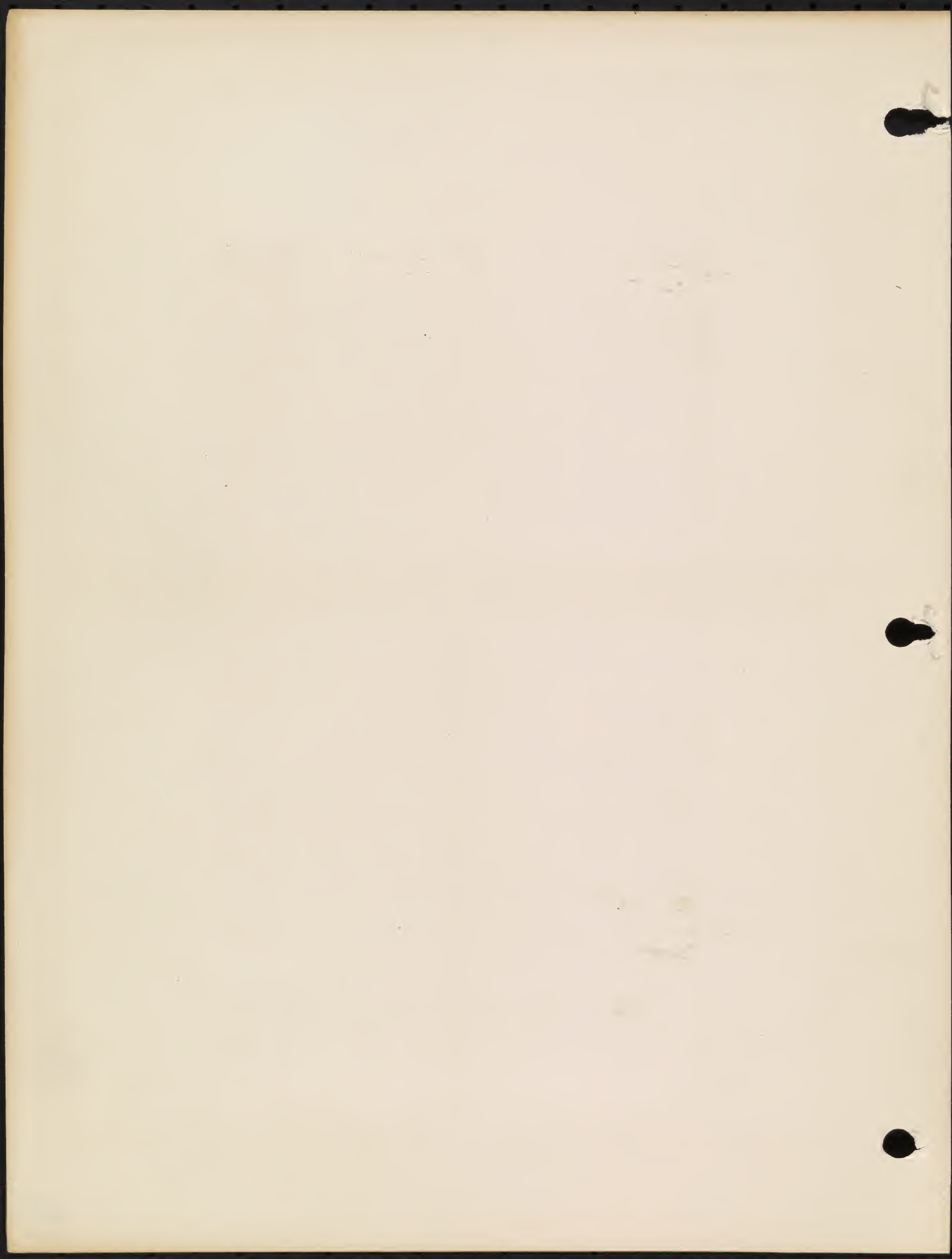




Plate XXX. Cranberry bog, Cape Cod, Massachusetts.



Plates XXXa and XXXb. Normal stem of cranberry plant, and stem broken off as result of gypsy moth feeding.





Plate XXXI. Early stage gypsy moth larvae  
spinning to the ground.

p. 279

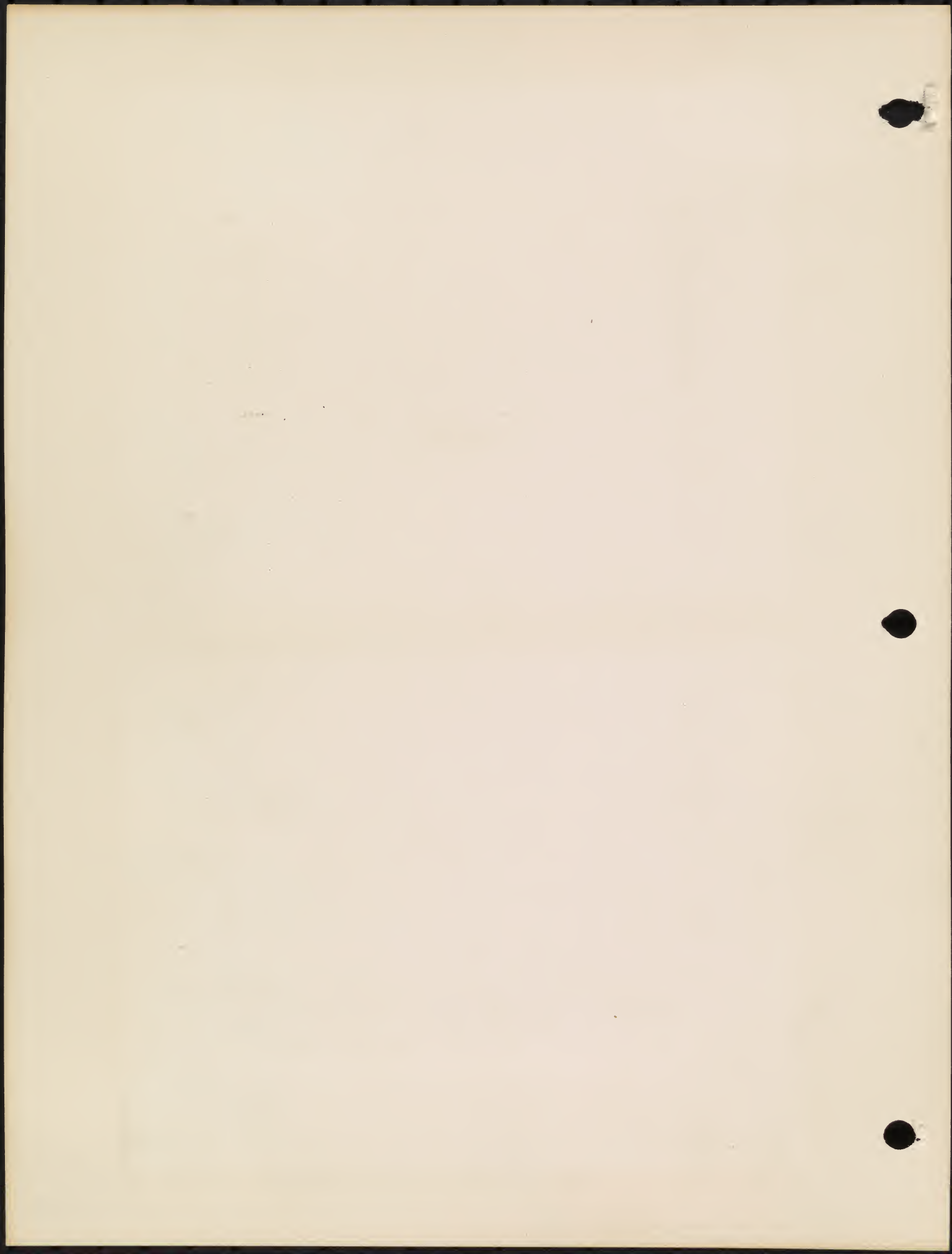




Plate XXXII. Application of banding material to tree with tree-banding gun.

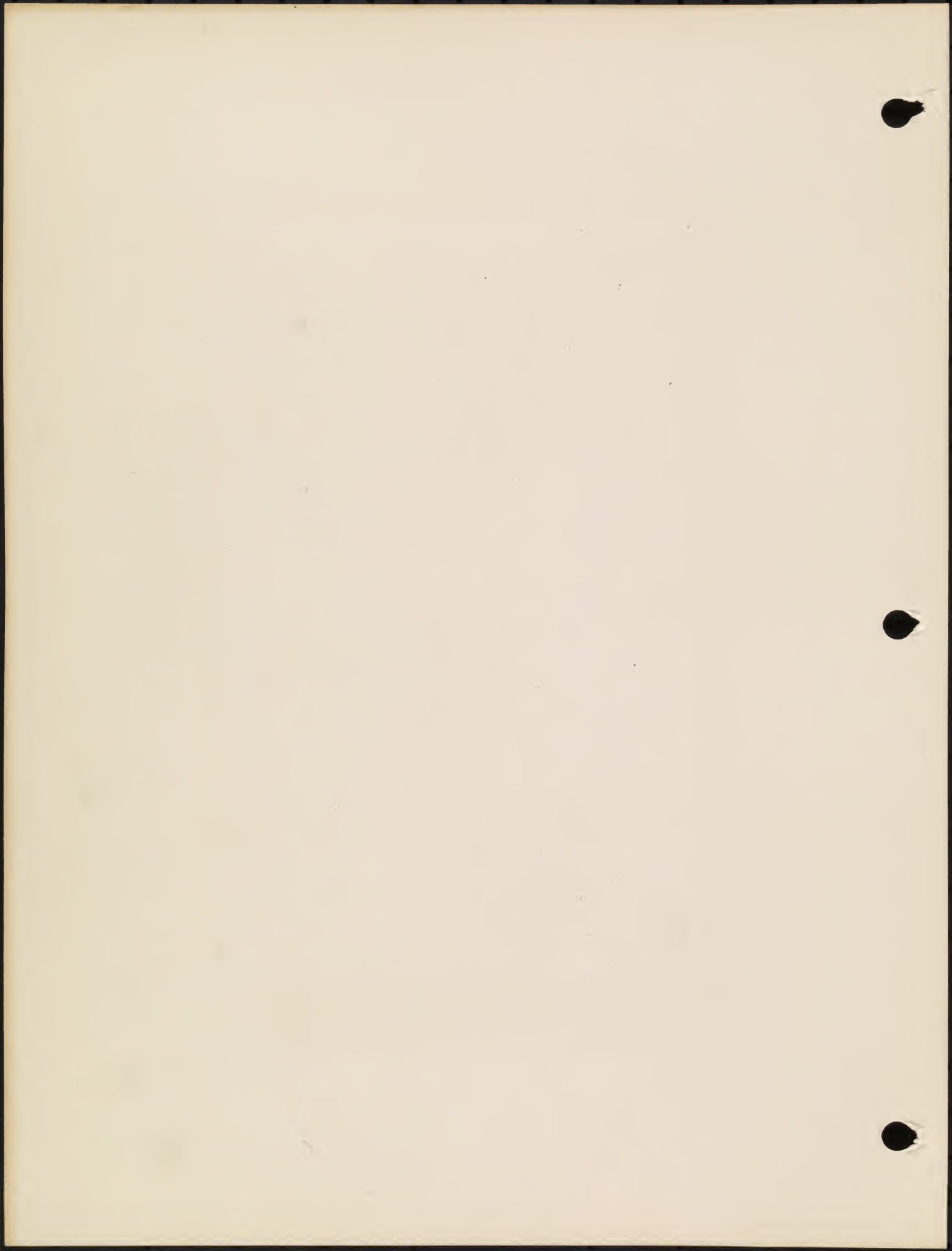


Plate XXXIIIa. Banding material on tree trunks showing gypsy moth larvae gathered below band and prevented from ascending into foliage.





Plate XXXIII. Brown-tail moths  
on arc-light pole, Beverly, Mass.



## WARNING!

The Bureau of Entomology and the Forest Service of the United States Department of Agriculture, in co-operation with the owner, are conducting on this property an experiment in Forest Management. The object of the experiment is to produce a forest growth which will be free from serious damage by insects.

Trespassing, the building of fires, the cutting, removal or injury of any material, grazing, dumping, or in any way altering the conditions existing on this area are positively prohibited.

OFFICE OF THE  
BUREAU OF ENTOMOLOGY,  
PREVENTING SPREAD OF MOTHS,  
43 TREMONT STREET,  
BOSTON, MASS.

D. F. HOUSTON,  
*Secretary of Agriculture.*

## AVIS AU PUBLIC!

Le Bureau d'Entomologie et le Service des Forêts du Ministère de l'Agriculture des États-Unis, d'accord avec le propriétaire de cette terre font ici des expériences sur la gestion des forêts.

Le but de ces expériences est de produire une végétation forestière qui soit exempte des sérieux ravages causés par les insectes.

Il est interdit d'allumer des feux de forêt, de couper, d'emporter ou d'endommager quelque ce soit. Il est aussi défendu de mettre des animaux en pâture, de déposer des ordures ou de changer, de quelque façon que ce soit les conditions actuelles de cet endroit.

BUREAU  
D'ENTOMOLOGIE DES ÉTATS-UNIS,  
CAMPAGNE CONTRE LES INSECTES NUISIBLES,  
(DIVISION DE BOSTON)  
43 TREMONT STREET,  
BOSTON, MASS.

D. F. HOUSTON,  
*Ministre de l'Agriculture.*

## AVVISO!

L'Ufficio di Entomologia ed il Servizio Forestale del Dipartimento di Agricoltura degli Stati Uniti, in cooperazione al proprietario, intraprendono su questa fondo un esperimento di coltura forestale.

Lo scopo dell'esperimento, è di promuovere uno sviluppo forestale immune dal grave danno cagionato dagli insetti.

È assolutamente proibito il passaggio, accendere fuochi, tagliare le piante, trasportare o guastare qualsiasi materiale, condurre animali al pascolo, gettare immondizie, o alterare in qualsiasi modo le condizioni attuali di questa proprietà.

UFFICIO DEL  
DIPARTIMENTO ENTOMOLOGICO,  
CONTRO LO SVILUPPO DELLA CROFONIA FORESTALE,  
(DIVISIONE DI BOSTON)  
43 TREMONT STREET,  
BOSTON, MASS.

D. F. HOUSTON,  
*Ministro di Agricoltura.*

## OSTRZEŻENIE!

Biuro Entomologiczne i Służba lasna Stanów Zjednoczonych Wydział Gospodarczy ze współudziałem właścicieli, prowadzi na tej własności zarządzając doświadczenia lesne. Głównym zadaniem jest podniesienie hodowli lasów i zapobieżeniu uszkodzenia drzewa przed gąsienicami.

Przechodzenie, rozpalenie ognia, scinanie drzew, zabieranie drzewa, lub jakikółwiek sposób uszkodzenia drzewom, paszacz bydło lub ścinając trawę, z sypywanie śmieci, lub zamienianie panującego porządku na całej tej przestrzeni jest surowo wzbronione.

BIURO O OWADACH  
ZAPOBIEŻENIA MNOŻENIA  
SIE GĄSIENIC,  
43 TREMONT STREET,  
BOSTON, MASS.

D. F. HOUSTON,  
*Sekretarz Agrykultury.*

Plate XXXIV. Poster used at silvicultural experimental plots, 1914.

p1296

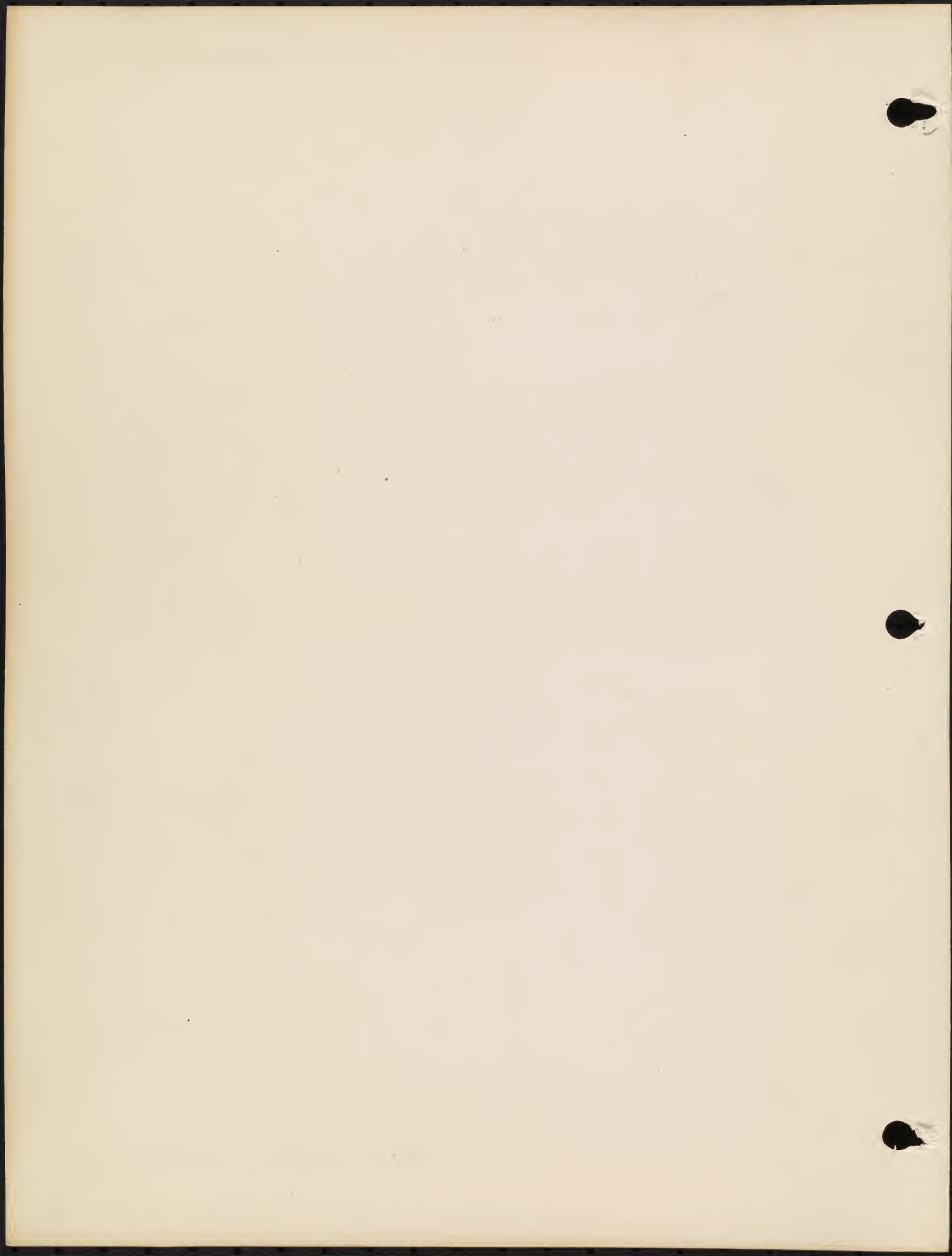




Plate XXXV. Gypsy moth egg clusters on sawed, piled lumber.



Plate XXXVa. Gypsy moth egg clusters on quarried stone.



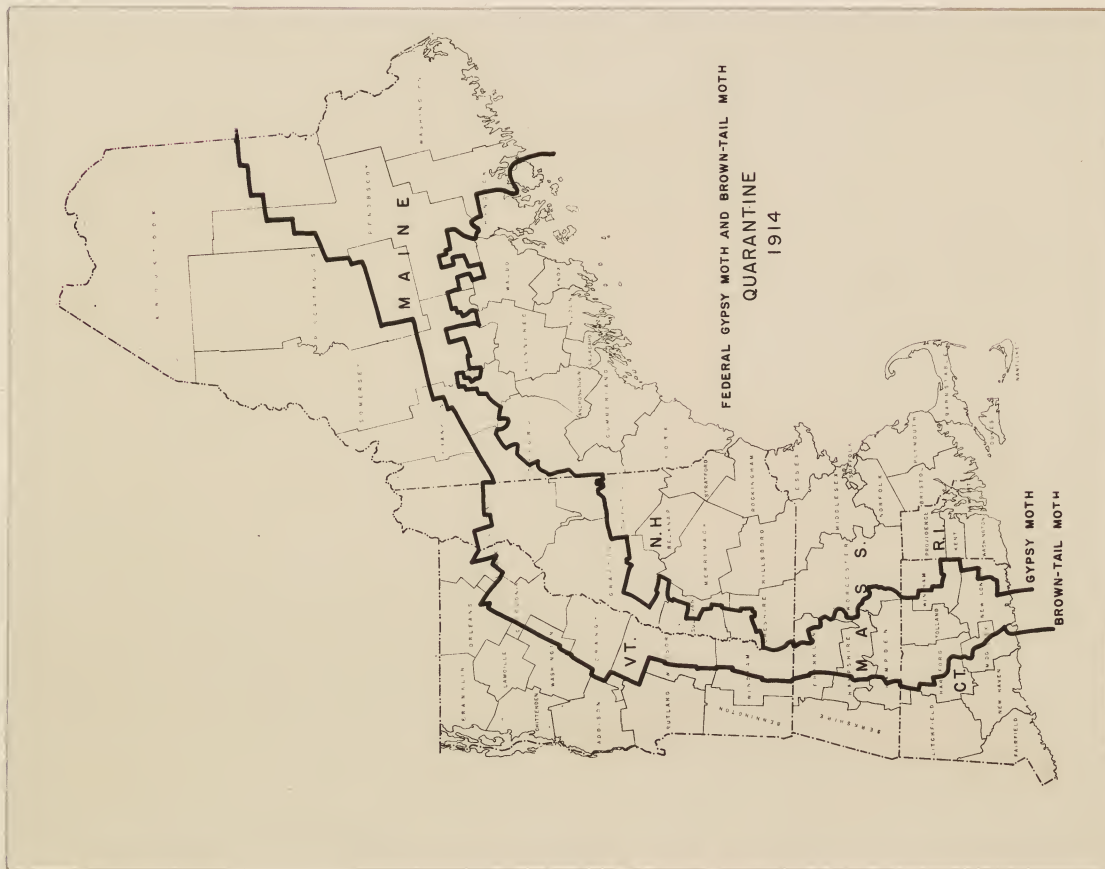


Plate XXXVI.

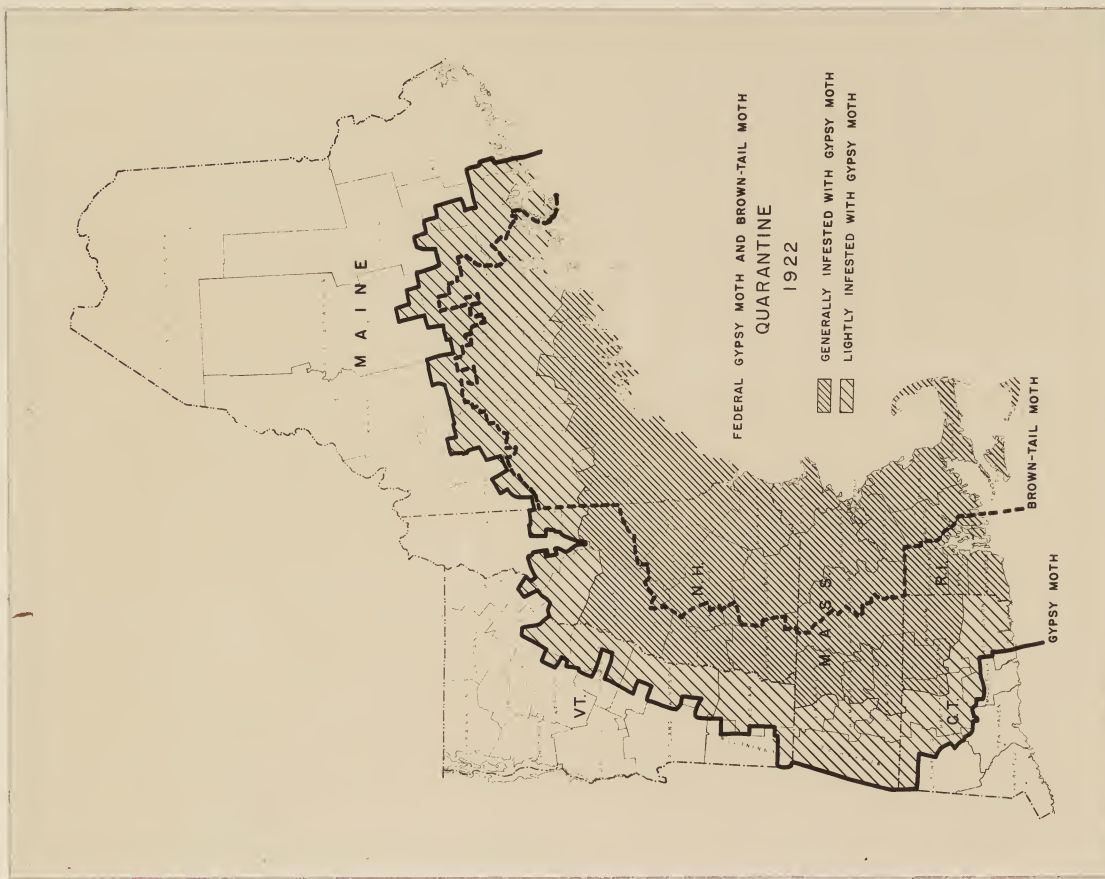


Plate XXXVIIa.

p. 311

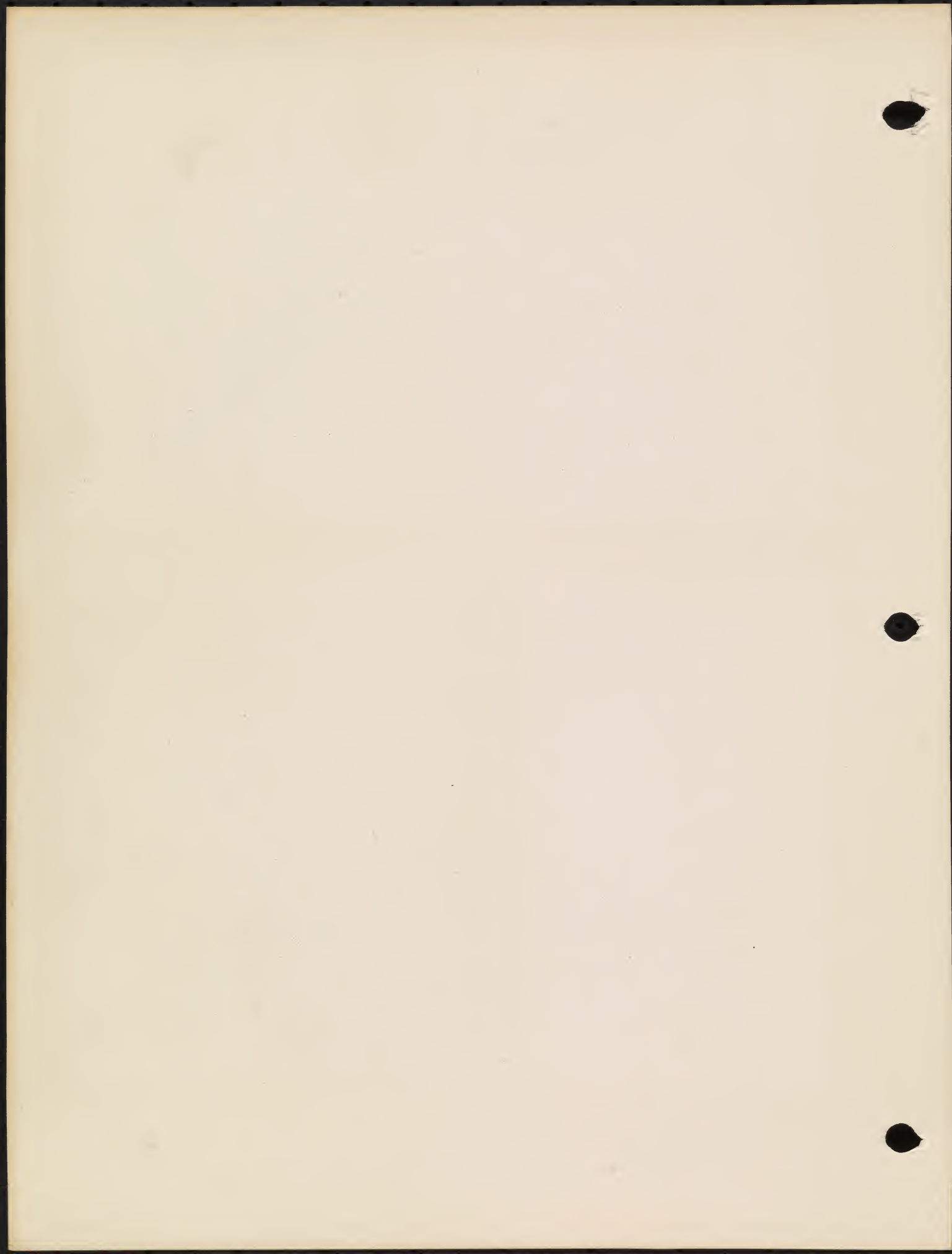




Plate XXXVII. Part of Koster blue spruce area in Dukes Park, New Jersey, not defoliated. 1920.



Plate XXXVIIa. Close-up of egg clusters and moths on defoliated tree.



Plate XXXVIIb. Trees killed by defoliation.



# GYPSY MOTH EXTERMINATION PROJECT IN NEW JERSEY

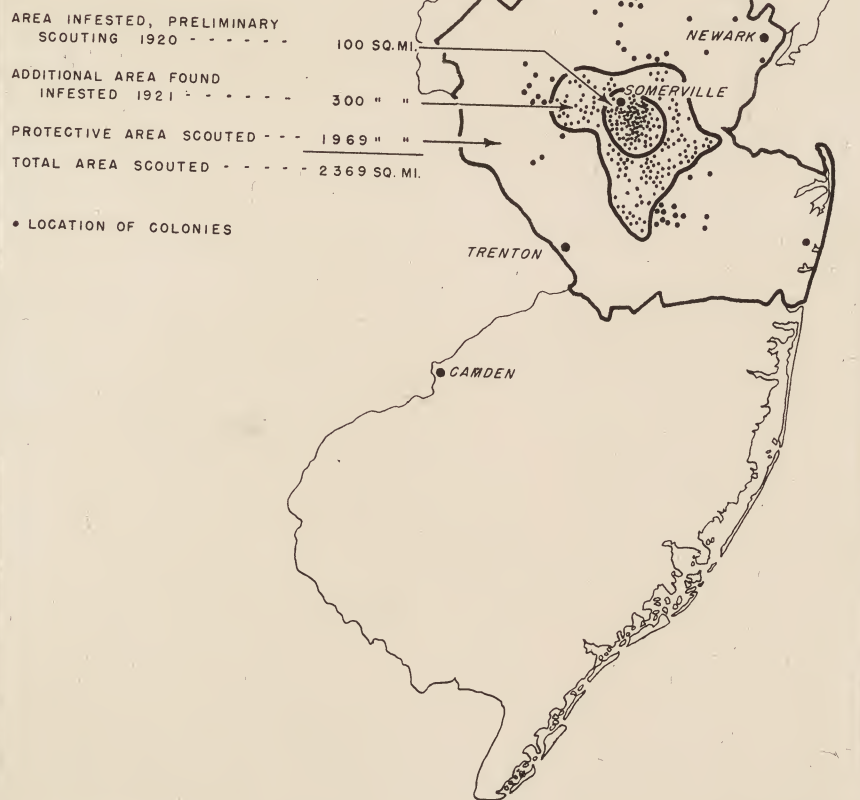


Plate XXXVIII.





Plate XXXIX. Headquarters, gypsy moth project, Bound Brook, New Jersey.



Plate XXXIXa. Storehouse and repair shop  
Bound Brook, New Jersey.

p-32.1





Plate XXVI. Remains of beautiful pines killed by the gypsy moth, Pine Banks Park, Malden, Mass., 1906.



Plate XXVIa. Pines at Arlington, Mass., showing results of use of tanglefoot bands, 1908.



# NEW JERSEY GYPSY MOTH EXTERMINATION PROJECT EXPENDITURES 1920 - 1932

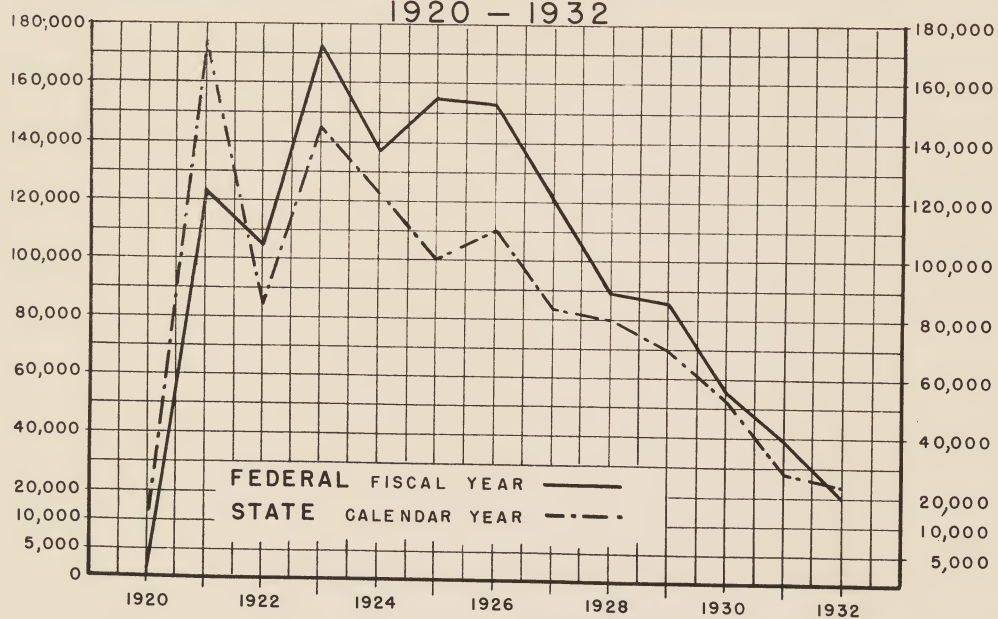


Plate XL.

533



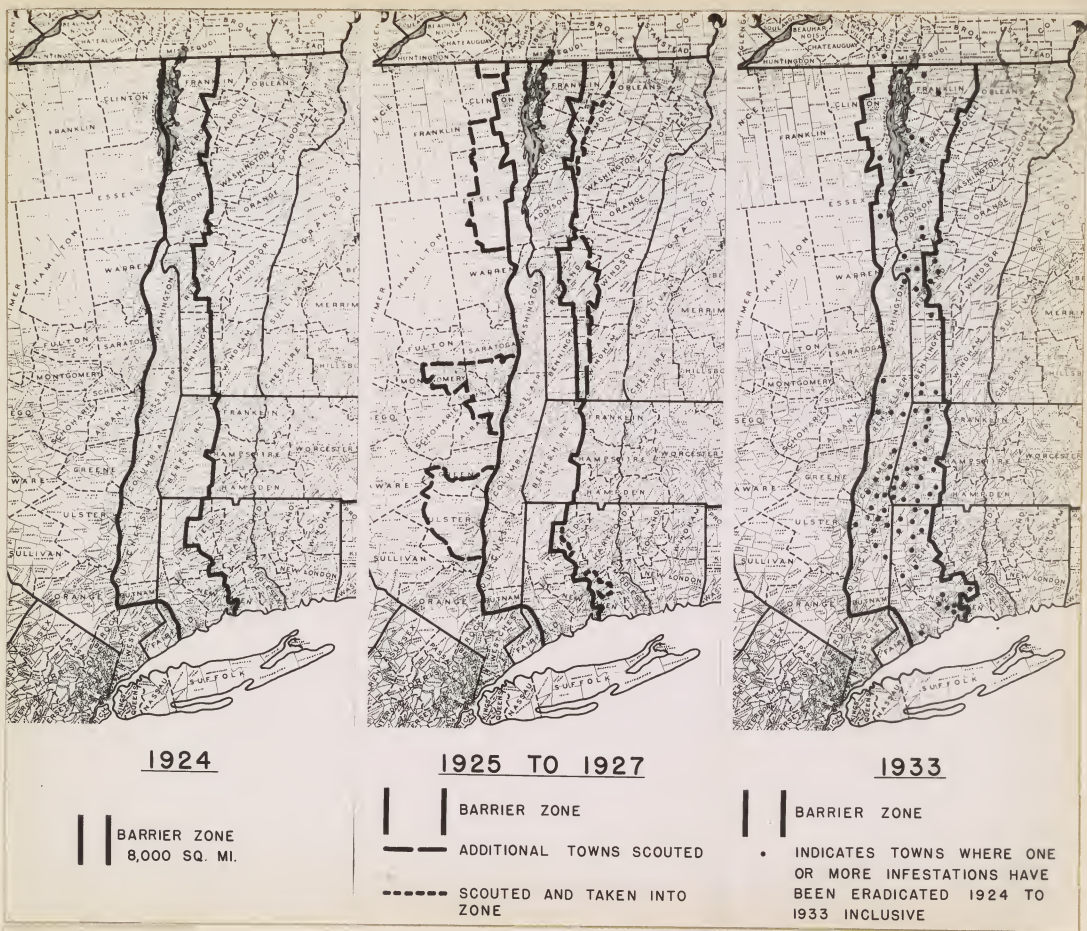


Plate XLI.

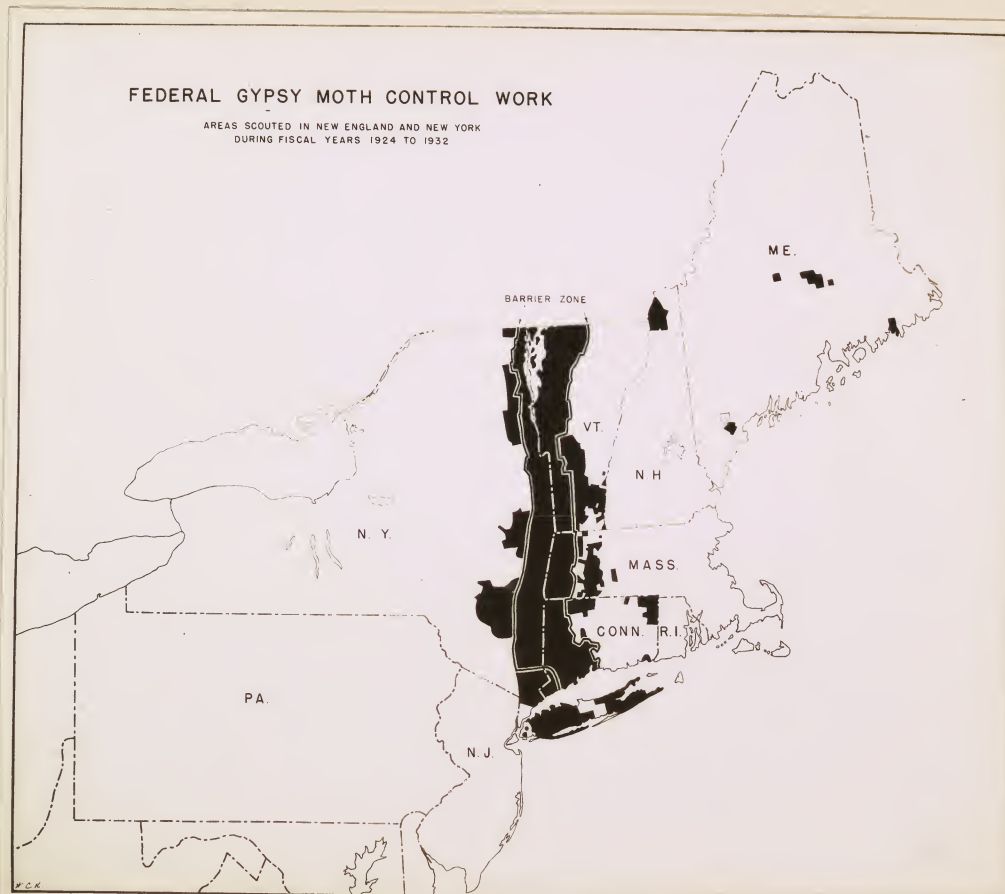


Plate XLIIa





Plate XLII. Temporary foreign parasite laboratories, 1923-1927.  
Upper left, Baja, Hungary; upper right, Debrecen, Hungary;  
lower left, Madrid, Spain; lower right, Galgamacsza, Hungary.

334





Plate XLIII. Defoliated woodland, Freetown, Massachusetts, 1927.

10336





Plate XLIV. Woodland spraying at Pittsfield, Massachusetts, 1929. Spray is shown covering trees 95 feet tall.

8-296





Plate XLV. Ford Model T Sprayer, operated by power take-off, 1929.



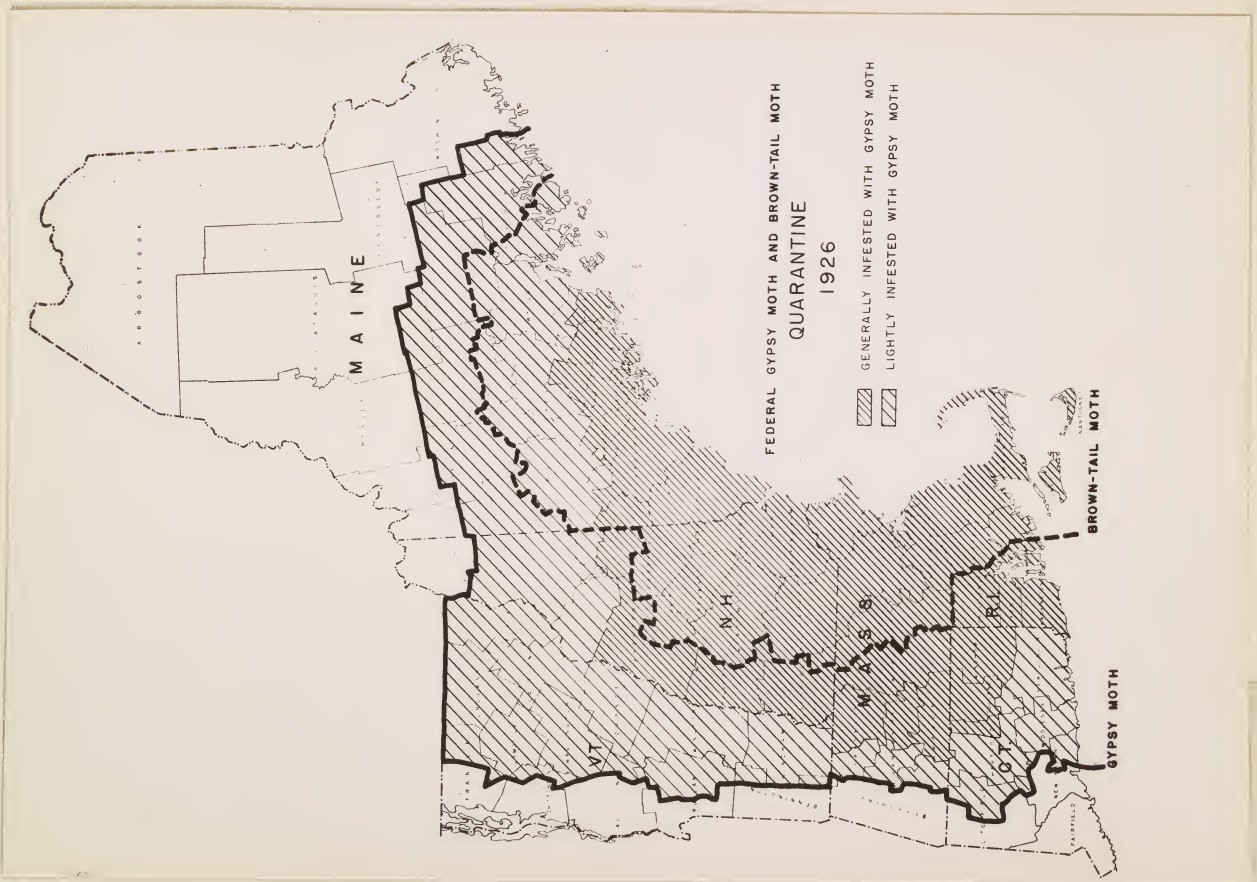


Plate XLVI

10-3-36  
354

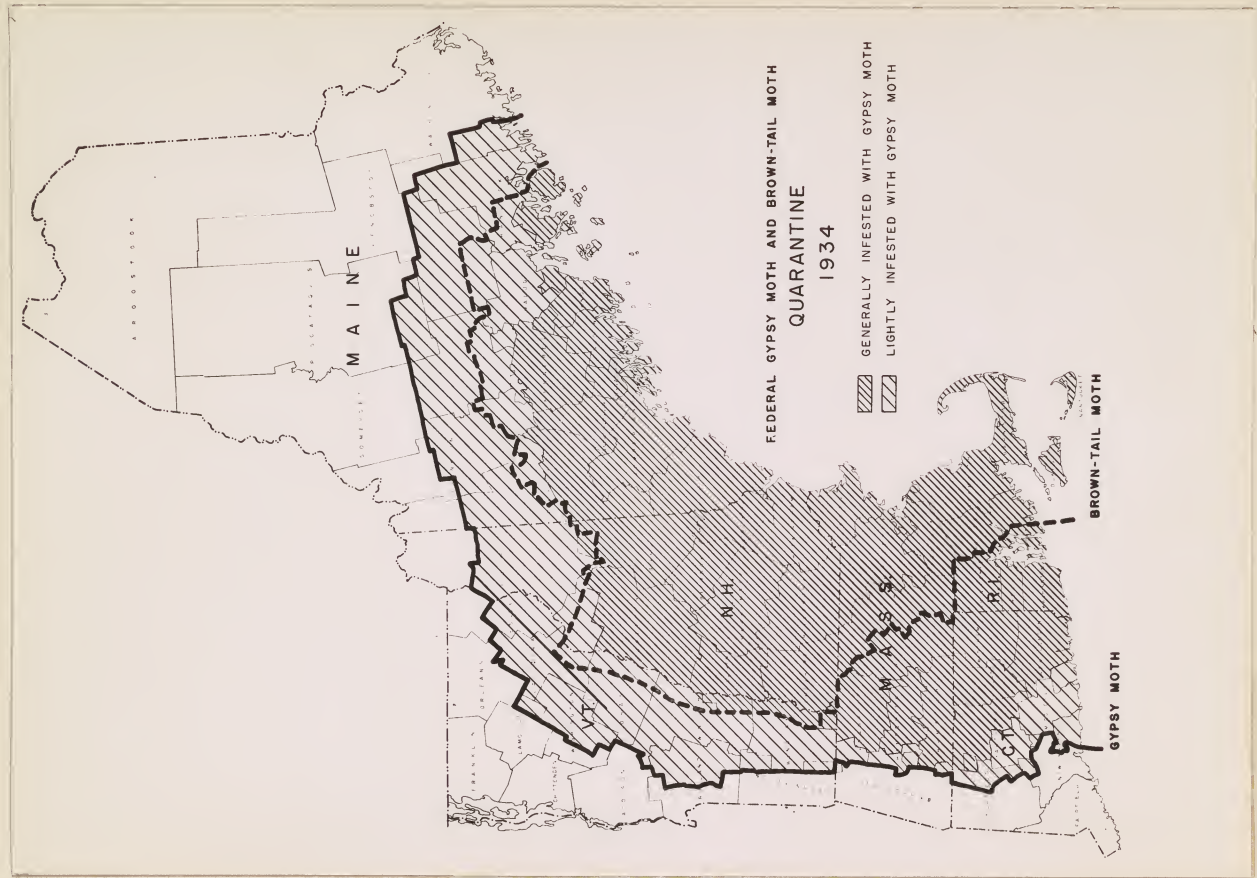


Plate XLVIIa

10-3-36





Plate XLVII. Christmas tree inspection work, Ludlow, Vermont, 1925.



Plate XLVIIa. Christmas trees on freight cars. 80 cars loaded or partly loaded for shipment from this siding at Hardwick, Vermont, 1937.





Plate XLVIII. Sawdust machine with tractor attached, for grinding accumulated brush in thinning operations, 1937.

41203  
382



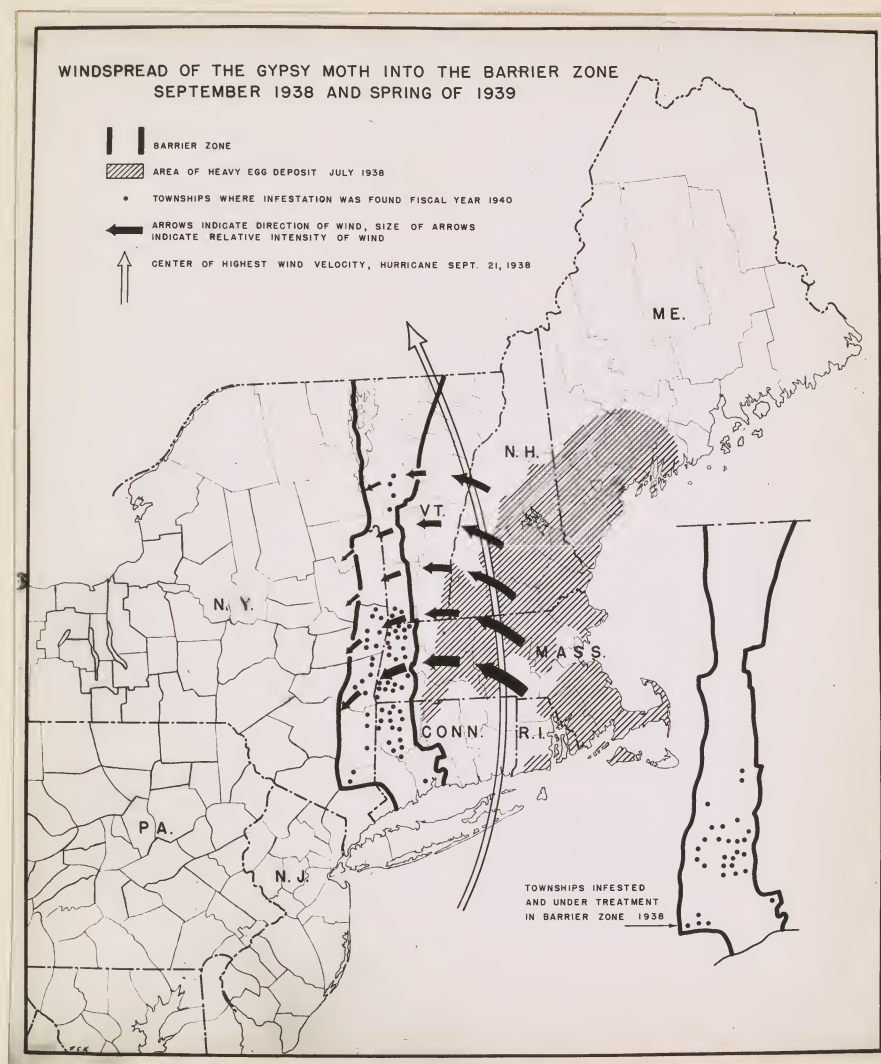


Plate XLIX. Effect of hurricane, September 1938.

10-293



# FEDERAL GYPSY MOTH CONTROL WORK

AREAS SCOUTED DURING FISCAL YEARS 1934 TO 1938

 WOODLAND AND OPEN SCOUTING  
 SURVEY SCOUTING

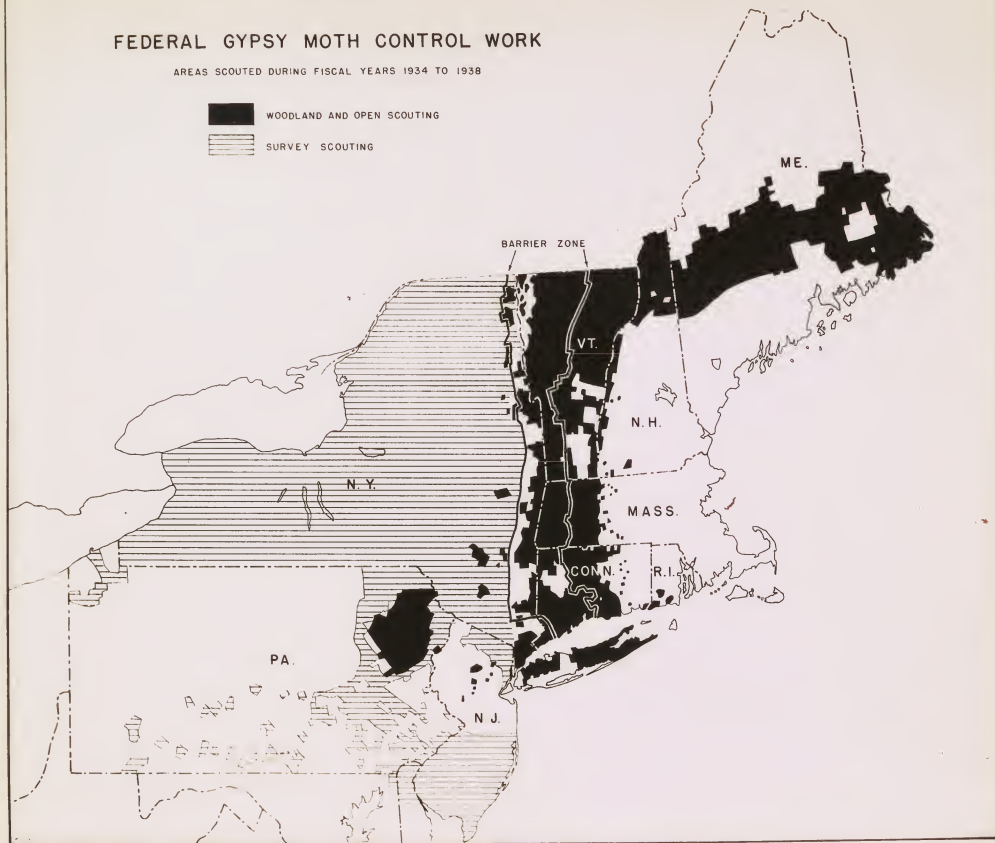


Plate I

# FEDERAL GYPSY MOTH CONTROL WORK

AREAS SCOUTED DURING FISCAL YEARS 1939 TO 1942  
BOTH WOODLAND AND OPEN SCOUTED TERRITORY INCLUDED

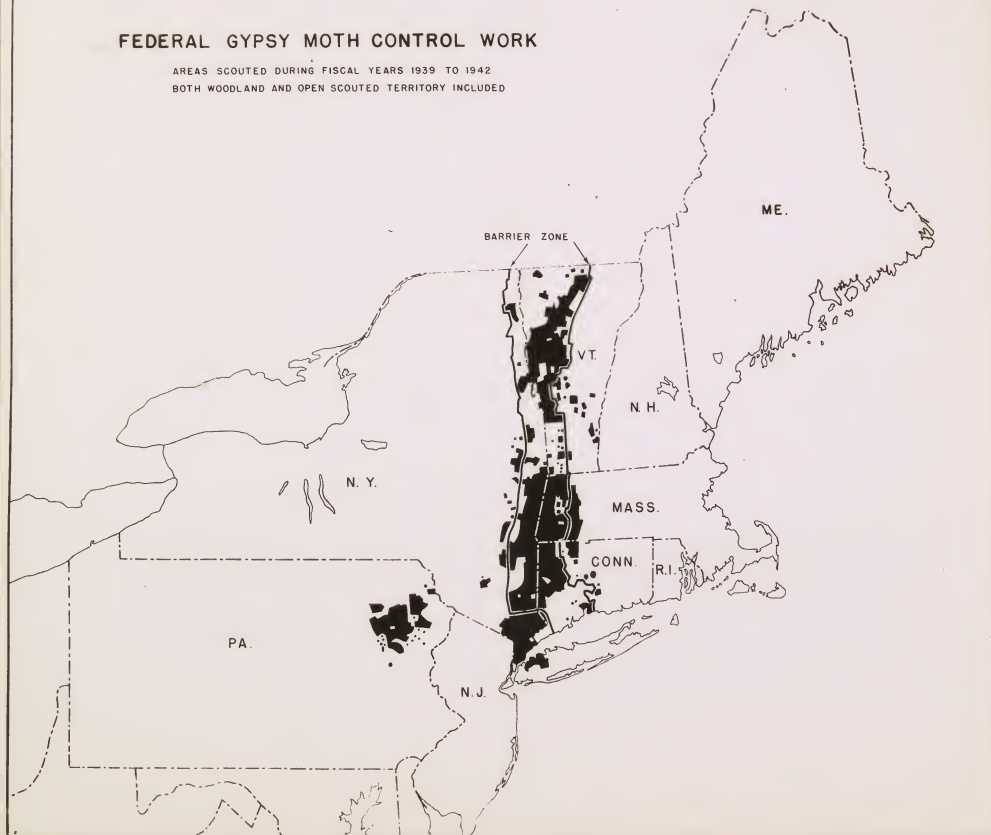


Plate Ia





Plate LI. Battery of four sprayers, loaned by Federal Corn Borer Control Division for gypsy moth spraying in Pennsylvania, 1933.

P. 470





Plate LII. Headquarters, Federal and State gypsy moth control work, 354 North River Street, Wilkes-Barre, Pennsylvania.



Plate LIIa. Storage buildings at Moosic, Pennsylvania, on site of abandoned CCC camp, 1937.



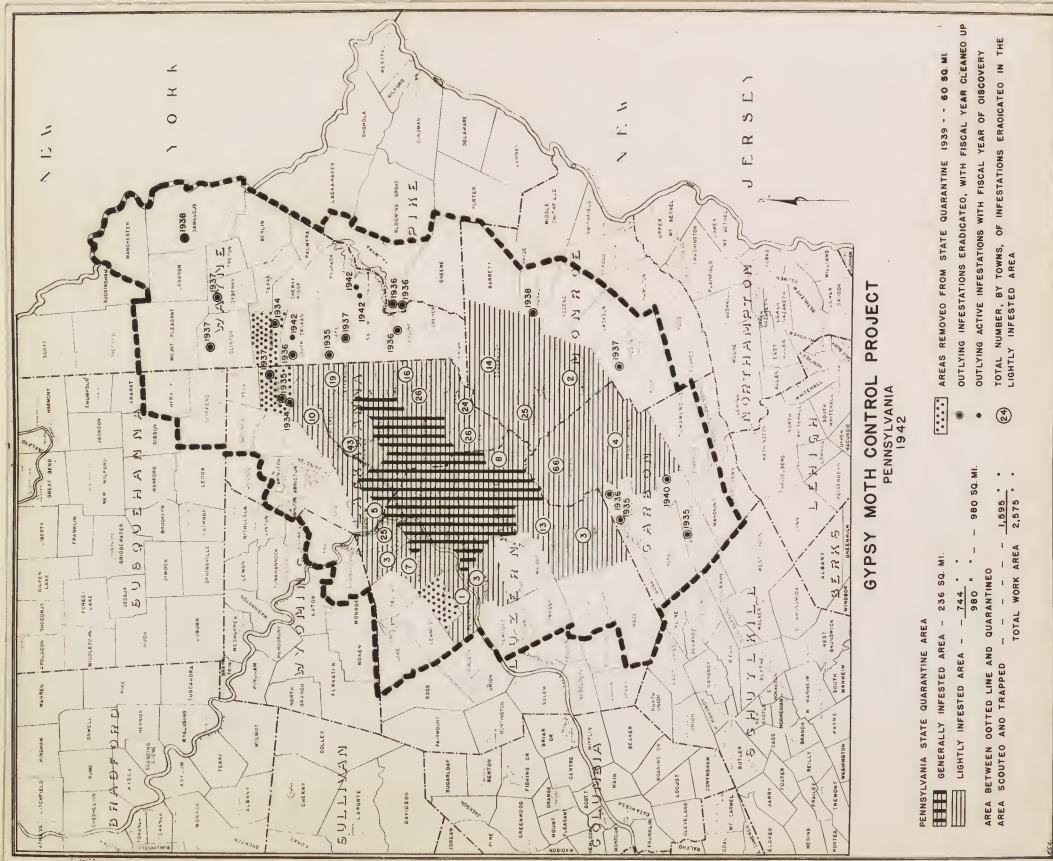


Plate LIII

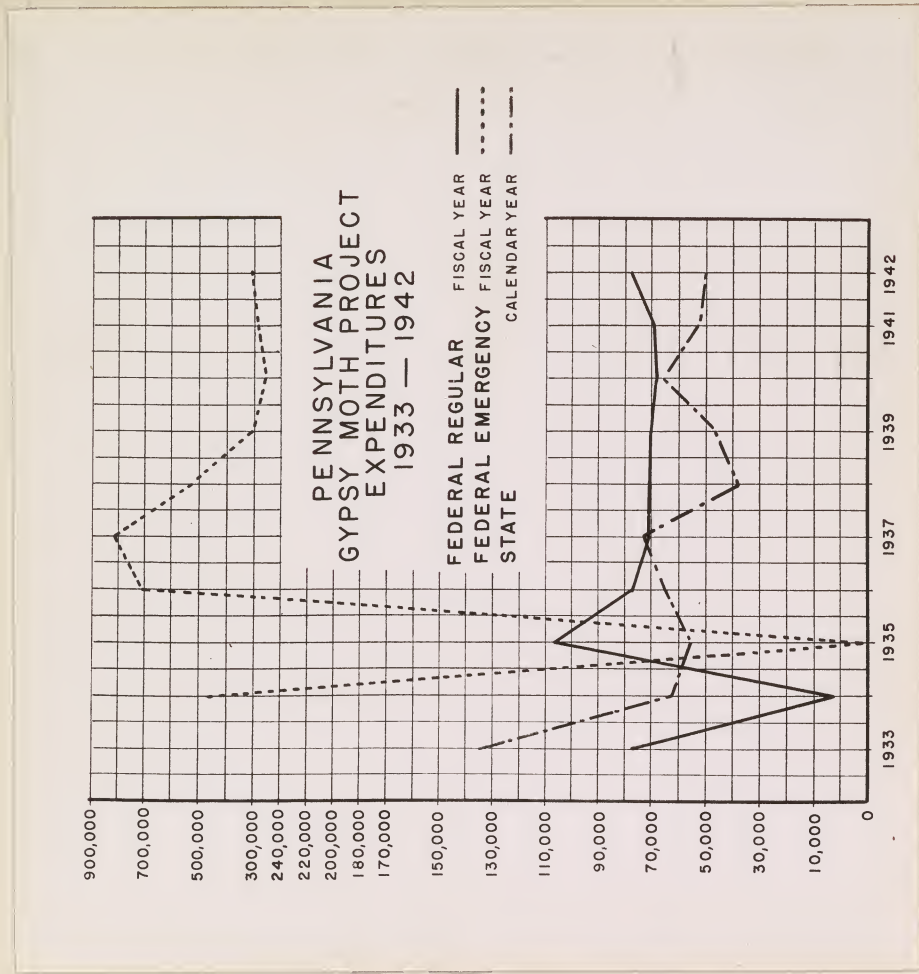
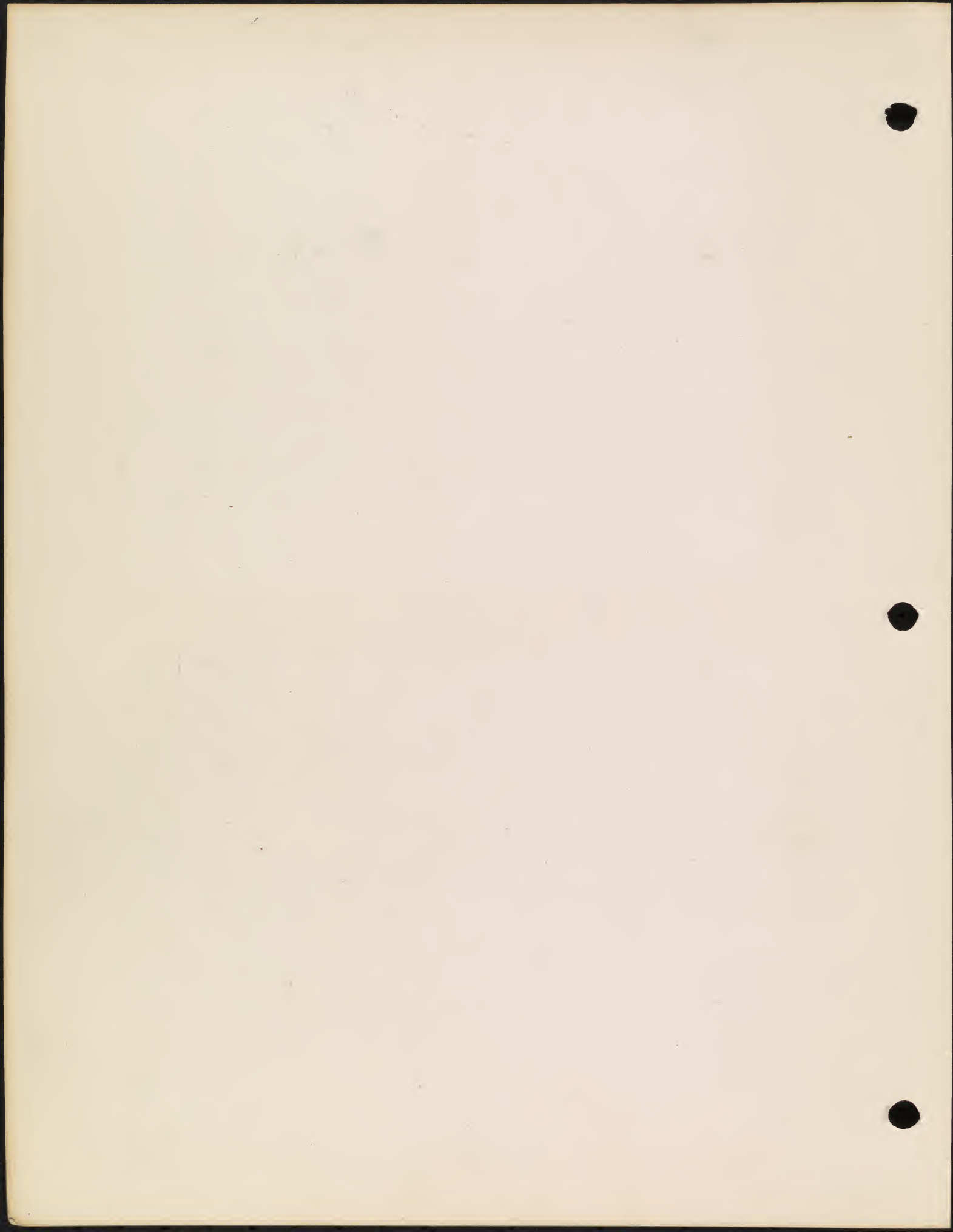


Plate LIIII



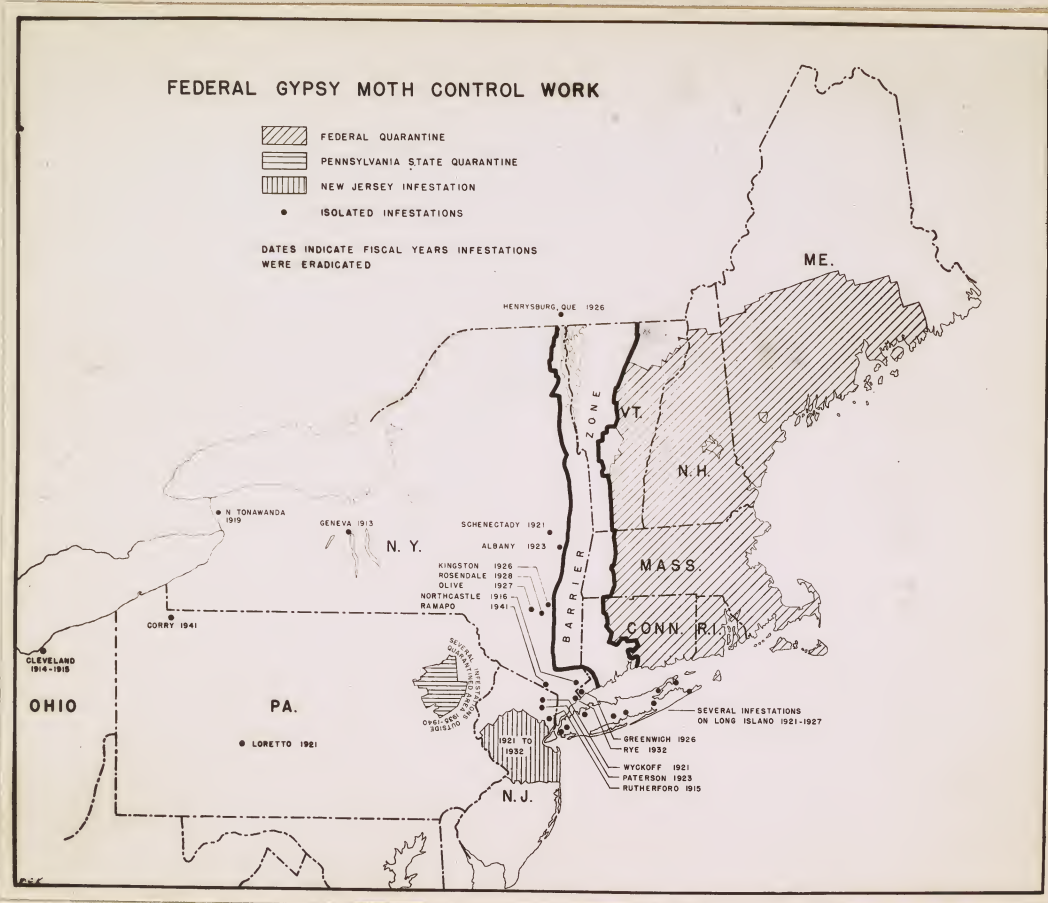


Plate LIV

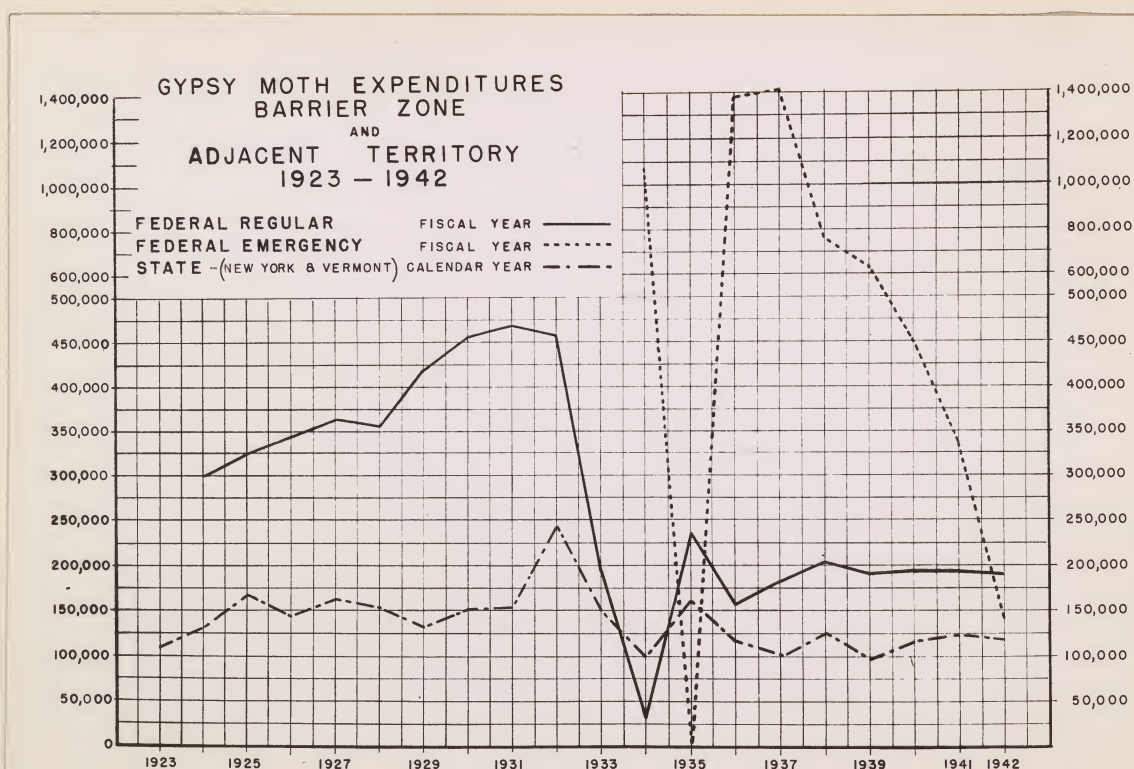


Plate LIVa



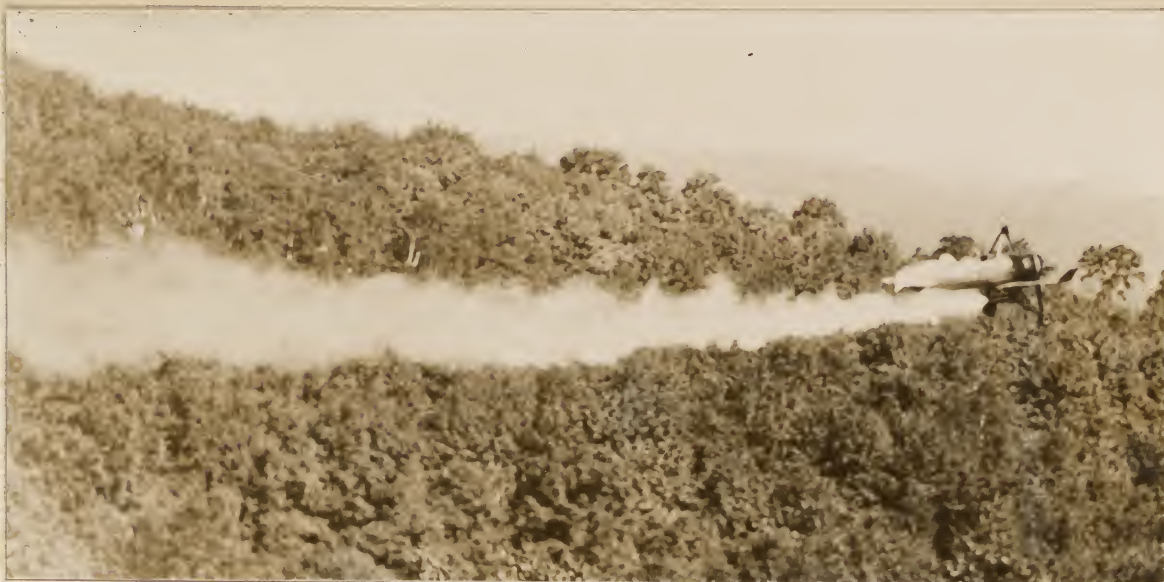


Plate LXII. Federal autogiro in flight, distributing air-mixed arsenate of lead and fish oil. Deerfield, Massachusetts, 1939.



Plate LXIIa. Autogiro at landing field, showing insecticide distributing apparatus attached below fuselage.



Plate LXIIb. Close-up of distributing apparatus.





Plate LXI. "Dayton hopper" for distribution of insecticides from airplane. Used on gypsy moth work in 1922.



Plate LXIa. Army blimp used experimentally for dusting arsenate of lead in New Hampshire, 1923.



Plate LXIb. Mooring gear used at landing field, Henniker, New Hampshire, during blimp experiment, 1923.

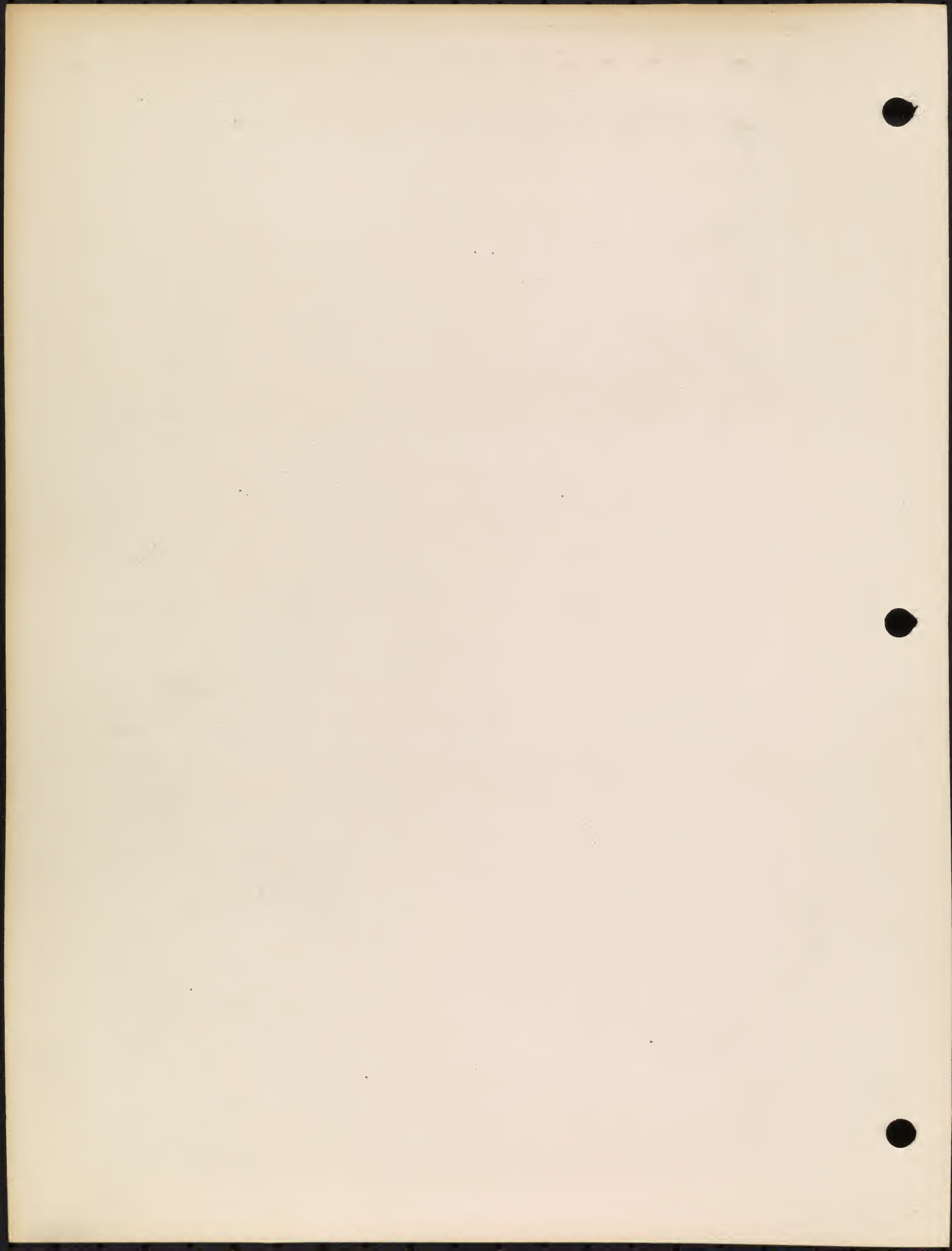




Plate LX. Self-powered 1,000 lbs. pressure sprayer attachment  
assembled by Federal gypsy moth division, 1938.

8.493



Plate LXa. Self-powered 1,500 lbs. pressure sprayer attachment,  
1937.

8.494



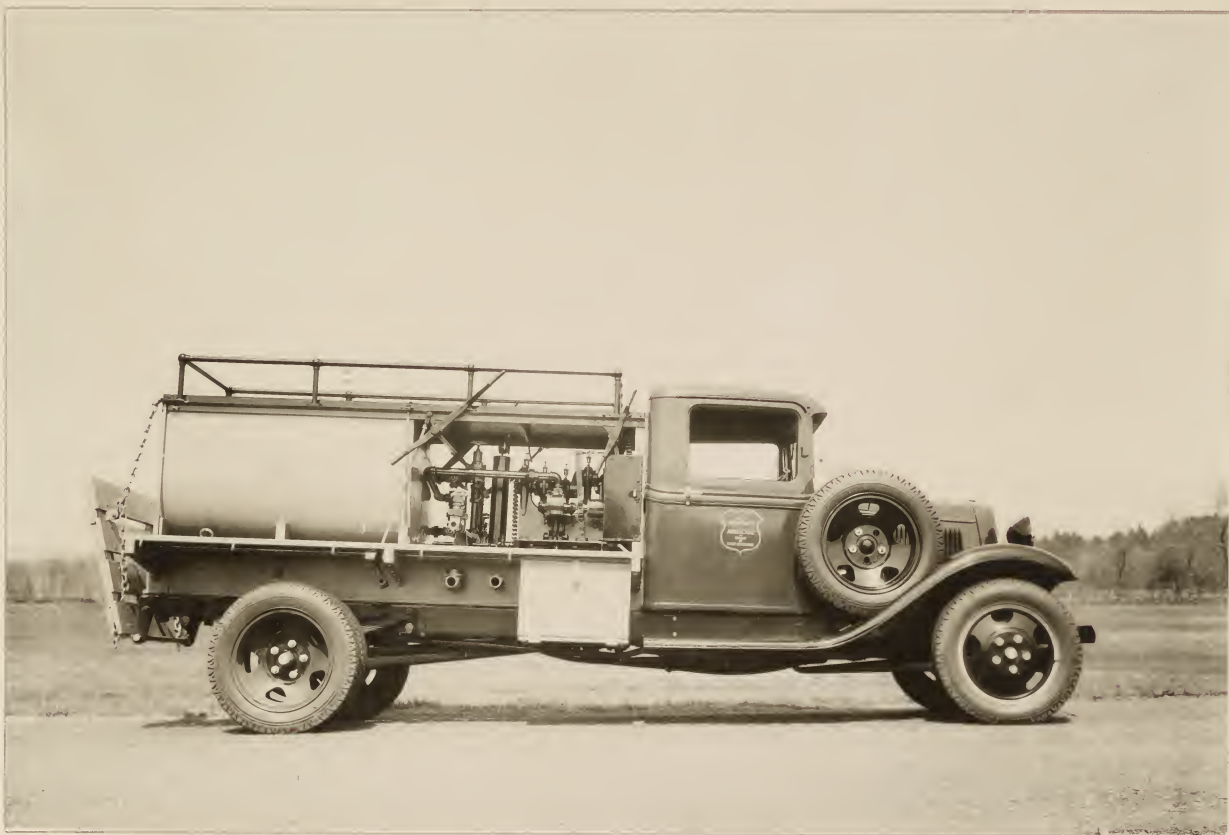


Plate LIX. Ford Model AA Sprayer, operated with power take-off. 1934.



Plate LIXa. Sprayer remodeled from apparatus used on Federal Corn Borer Project. 1934



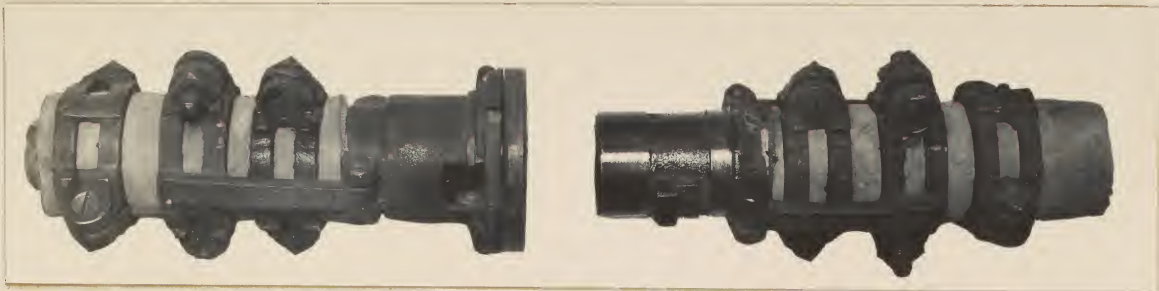
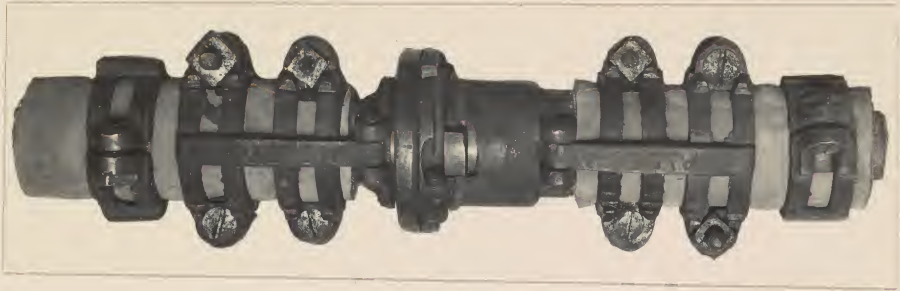
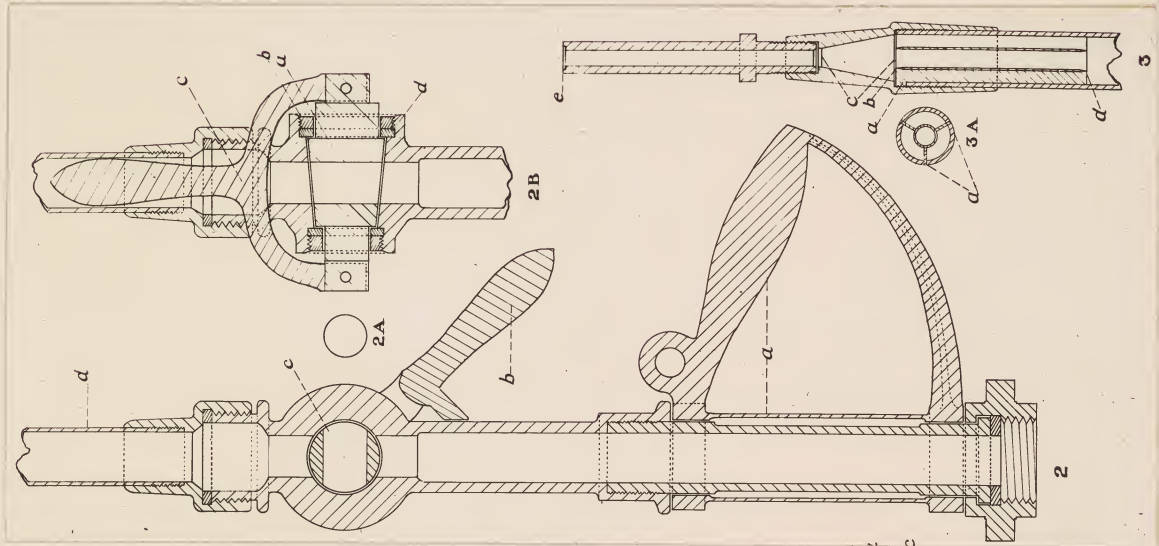
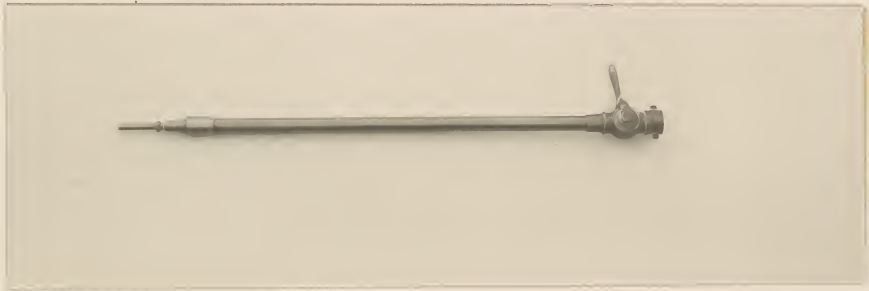
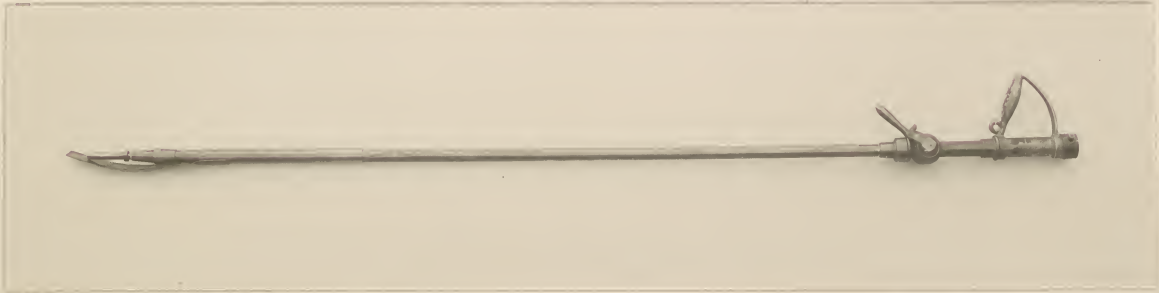


Plate LVIII.

Worthley nozzle for solid stream spraying, regular size with spreader and smaller size, and drawings showing its detail, 1910. Quick-hitch hose coupling, coupled and uncoupled, improved model, 1925.



# GYPSY MOTH CONTROL WORK

## METHOD OF WOODLAND SCOUTING

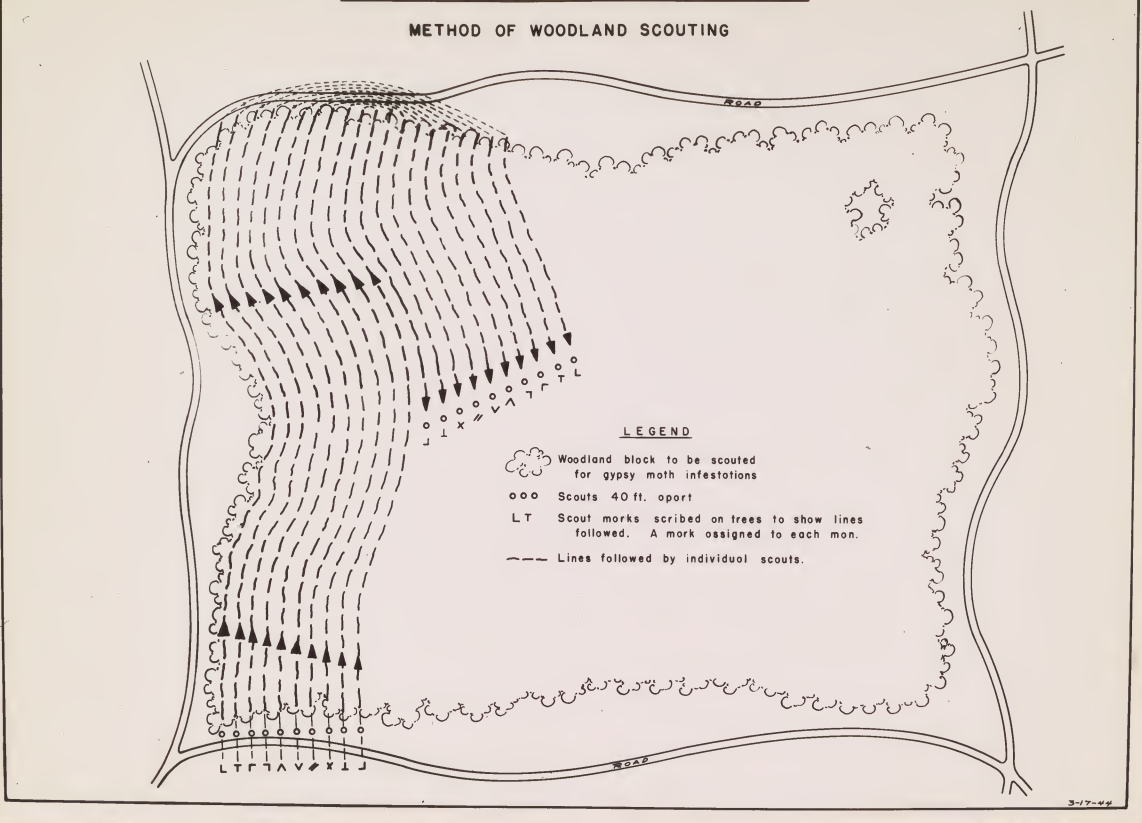


Plate LVI

# GYPSY MOTH CONTROL WORK

## System For Laying Hose Lines To Spray Infested Woodlands

SCALE 1 in = 100 ft

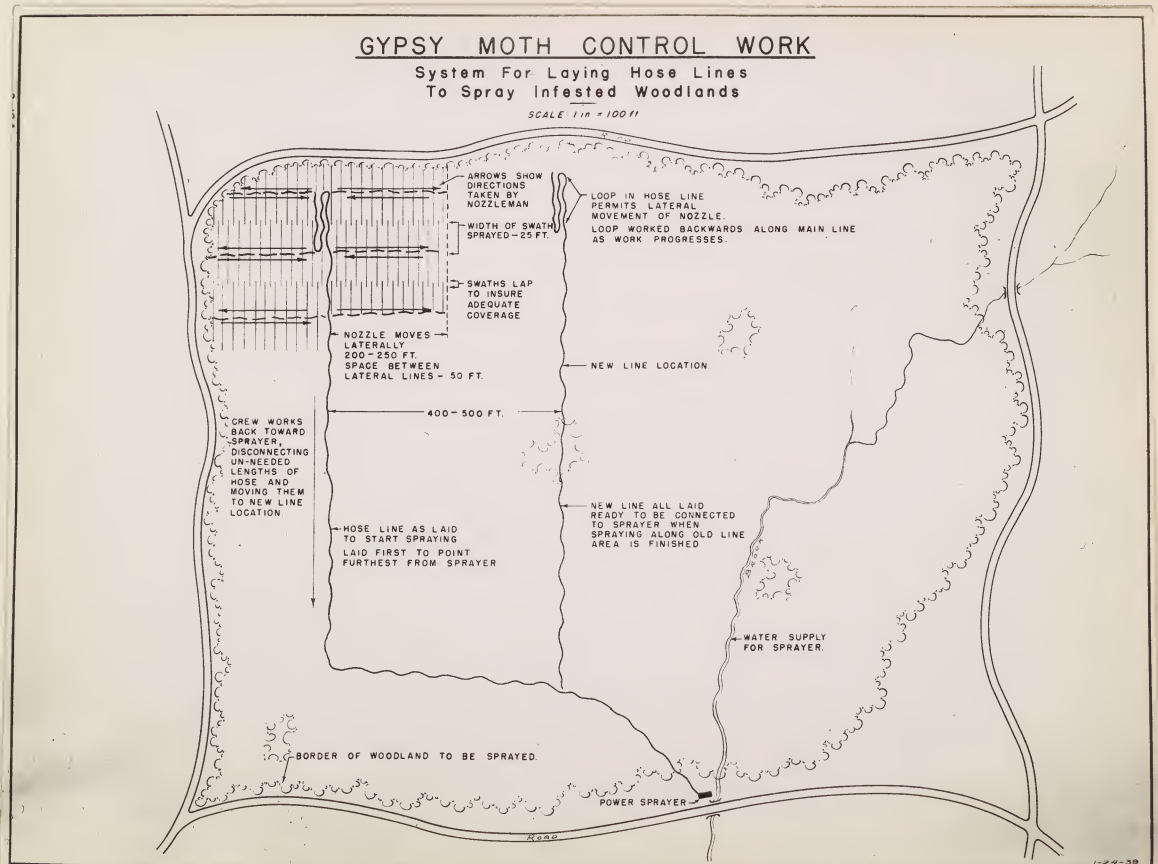


Plate LVIa





Plate LV. 5,740 bushels of brown-tail moth webs. This is a portion of 13,647,089 webs cut in New Hampshire under Federal and State CWA projects, 1934.



Plate LVa. Part of 2,768,461 brown-tail moth webs cut in 150 New Hampshire towns during Federal Agency WPA project from October 1935 to May 1936.





Plate LXIII. Ford touring car purchased 1913.



Plate LXIIIa. Motorcycles purchased in 1909 and Chalmers touring car purchased in 1913 for field supervisory force.





Plate LXIV. One half ton pickup truck used by field supervisors and crew foremen in transportation of crews. 1936.



Plate LXIVa.  $1\frac{1}{2}$  ton truck used for transportation of workers and for delivery of supplies to the field. 1936.

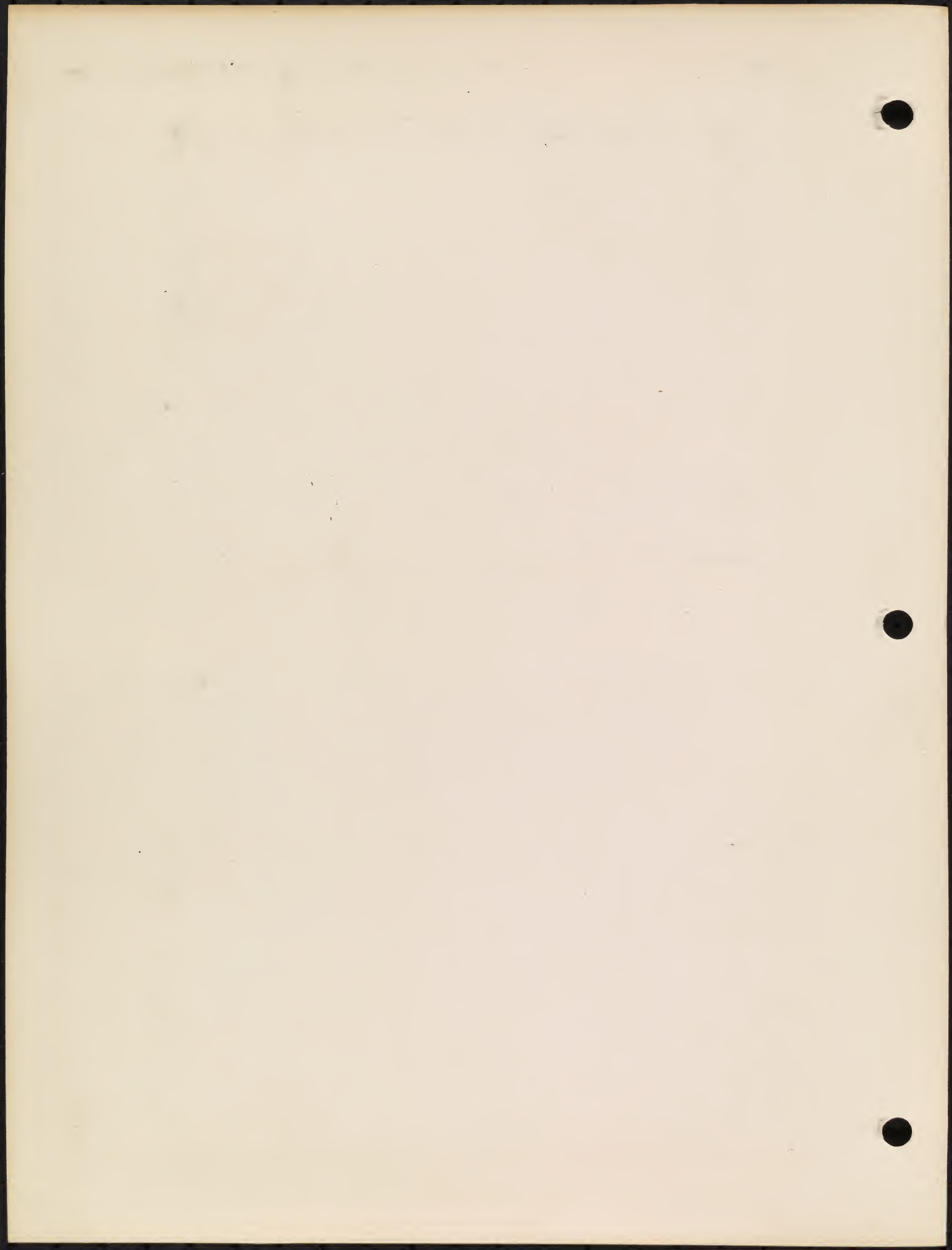




Plate LXV. Sedan for official use and special assignments. 1938.



Plate LXVa. Beach wagon for transportation of personnel and miscellaneous travel. 1939

507





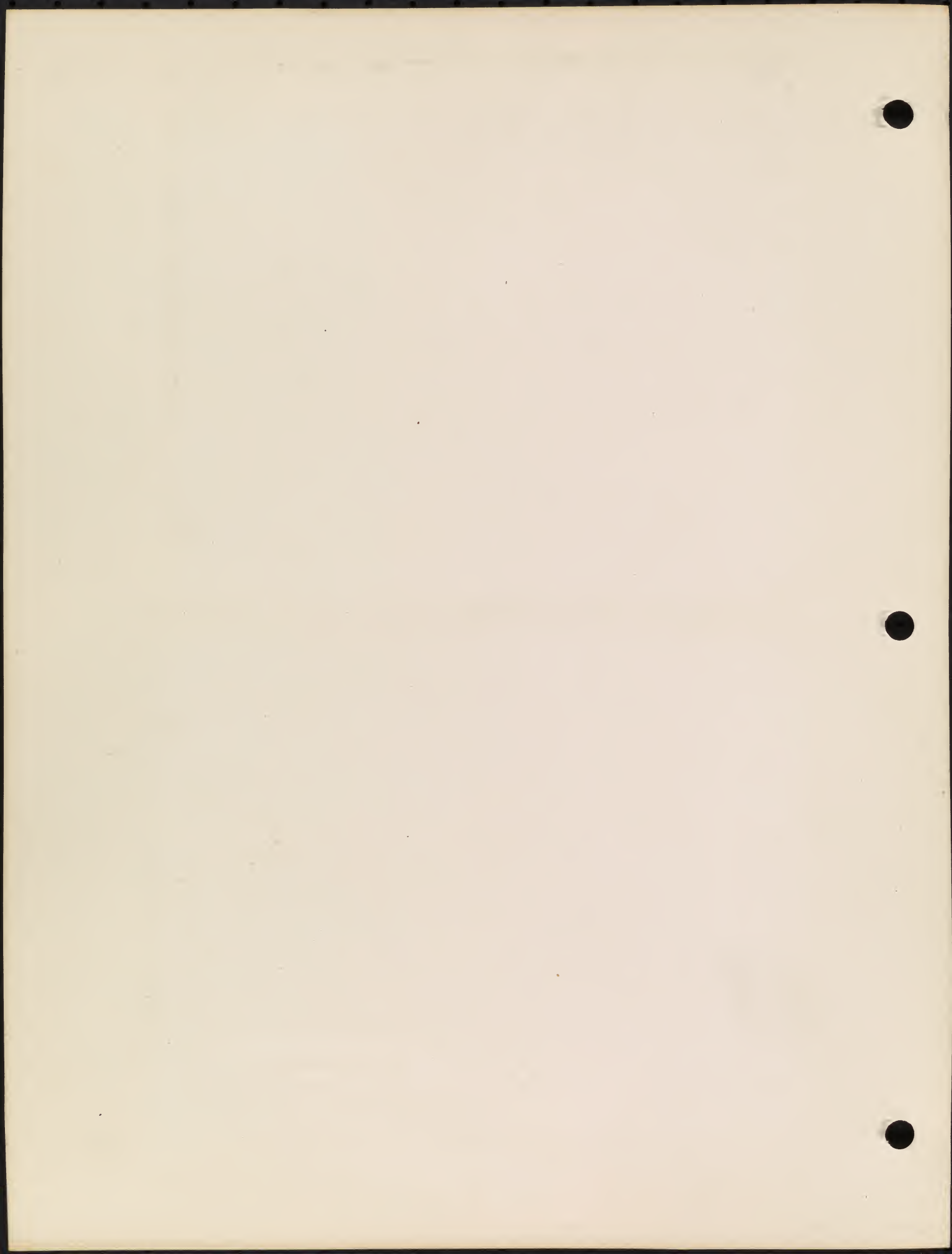
Plate LXVI. Division headquarters, Federal gypsy moth and brown-tail moth control work, 20 Sanderson Street, Greenfield, Massachusetts, 1931 to present date.



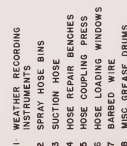
Plate LKVIa. Repair shop, Federal gypsy moth and brown-tail moth control work, 38 Haywood Street, Greenfield, Massachusetts.







## FLOOR PLAN OF



UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL RESEARCH ADMINISTRATION  
Bureau of Entomology & Plant Quarantine  
Gypsy & Brown-Igitt Moths Control

SCALF

Plate LXVIIIa

Box A

## FLOOR PLAN OF

UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL RESEARCH ADMINISTRATION  
Bureau of Entomology & Plant Quarantine  
Eggsy & Green-Ill Moths Control



Plate LXVIII

XXV  
XXVI  
XXVII



Plate LXIX. Inverted tin cup assembling cage attached to tree. This type cage in use from 1928 to 1941.



Plate LXXa. Cone-shaped specially treated paper cage used on assembling work beginning in 1942.



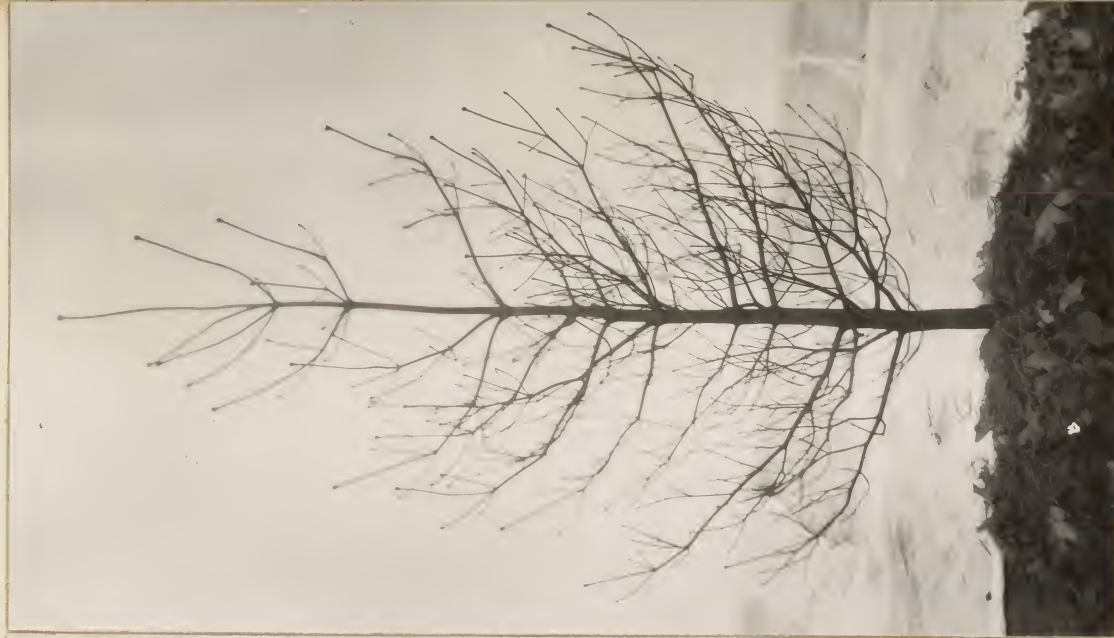


Plate LXX. White pine artificially defoliated for instruction purposes. Figure 1. Full foliage. Figure 2. 50% defoliated. Figure 3. 100% defoliated.

1507





Plate LXXI. White oak artificially defoliated for instruction purposes.  
 Figure 1. Full foliage. Figure 2. 50% defoliated.  
 Figure 3. 75% defoliated. Figure 4. 100% defoliated.

0.517





Plate LXXII. Wooded slope, mostly oak, defoliated. Plymouth, Massachusetts, 1933.



Plate LXXIIa. Trees killed after defoliation in stand of less favored food trees. Falmouth, Massachusetts, 1941.

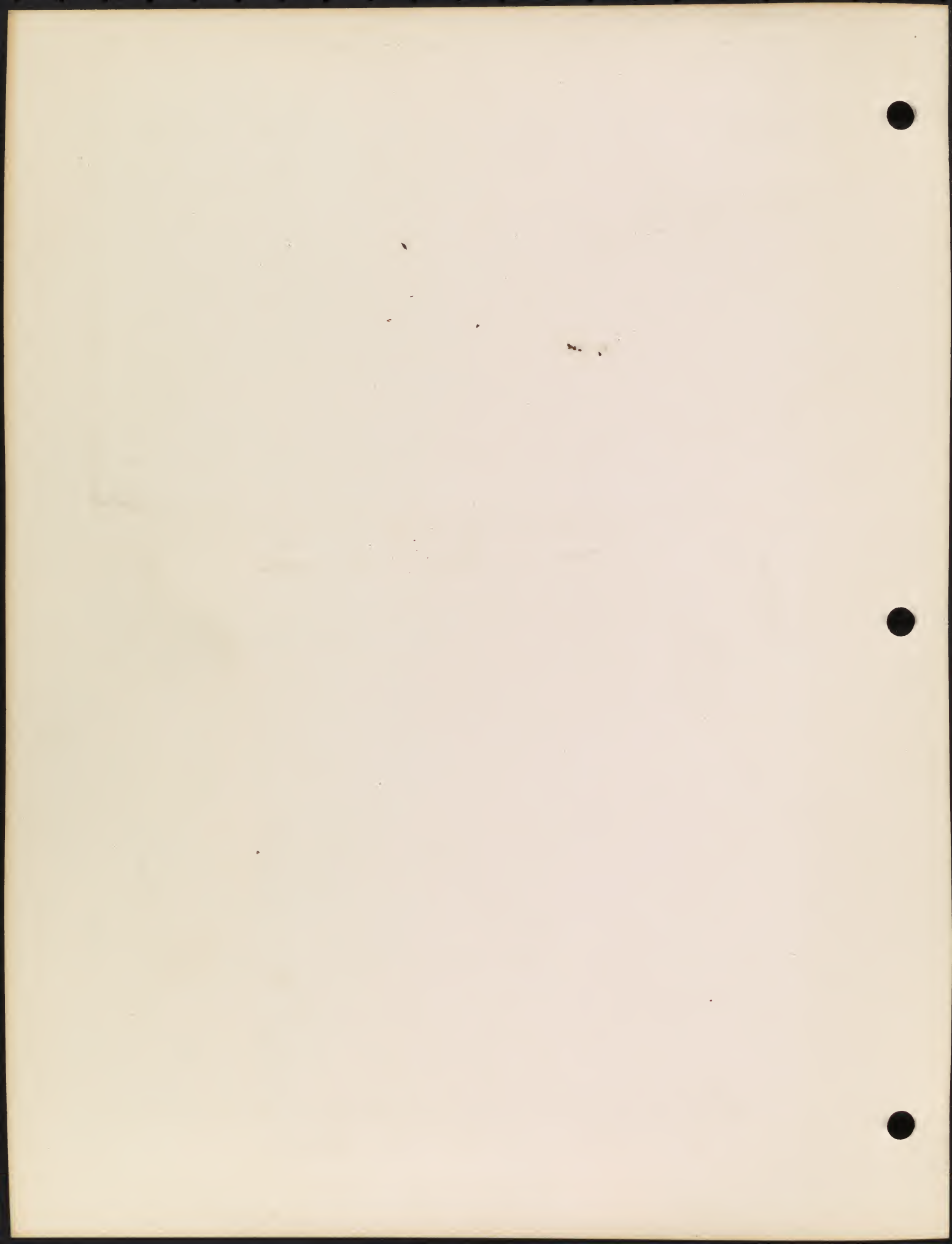




Plate LXXIII. Wooded area, extending over 200 acres, of pine and oak, completely defoliated, Sandwich, Massachusetts, 1926.



Plate LXXIIIa. Part of 40 acre woodland, showing large trees killed. Sandwich, Massachusetts, 1926.

8.242





Plate LXXIV. Black, red and white oak, intermixed, killed by gypsy moth defoliation. Groton, Connecticut, 1935.

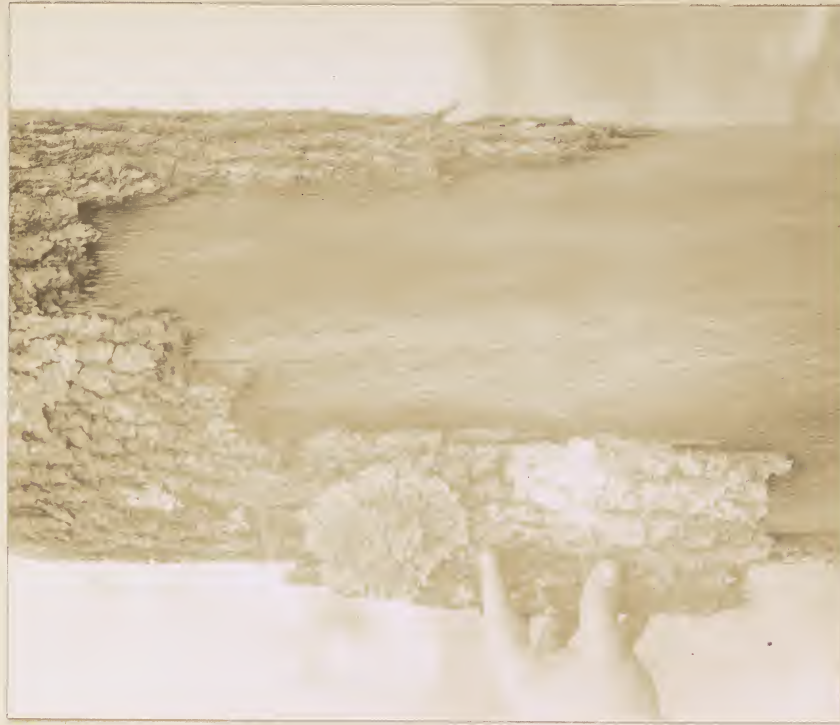


Plate LXXIVa. Close-up of killed tree.

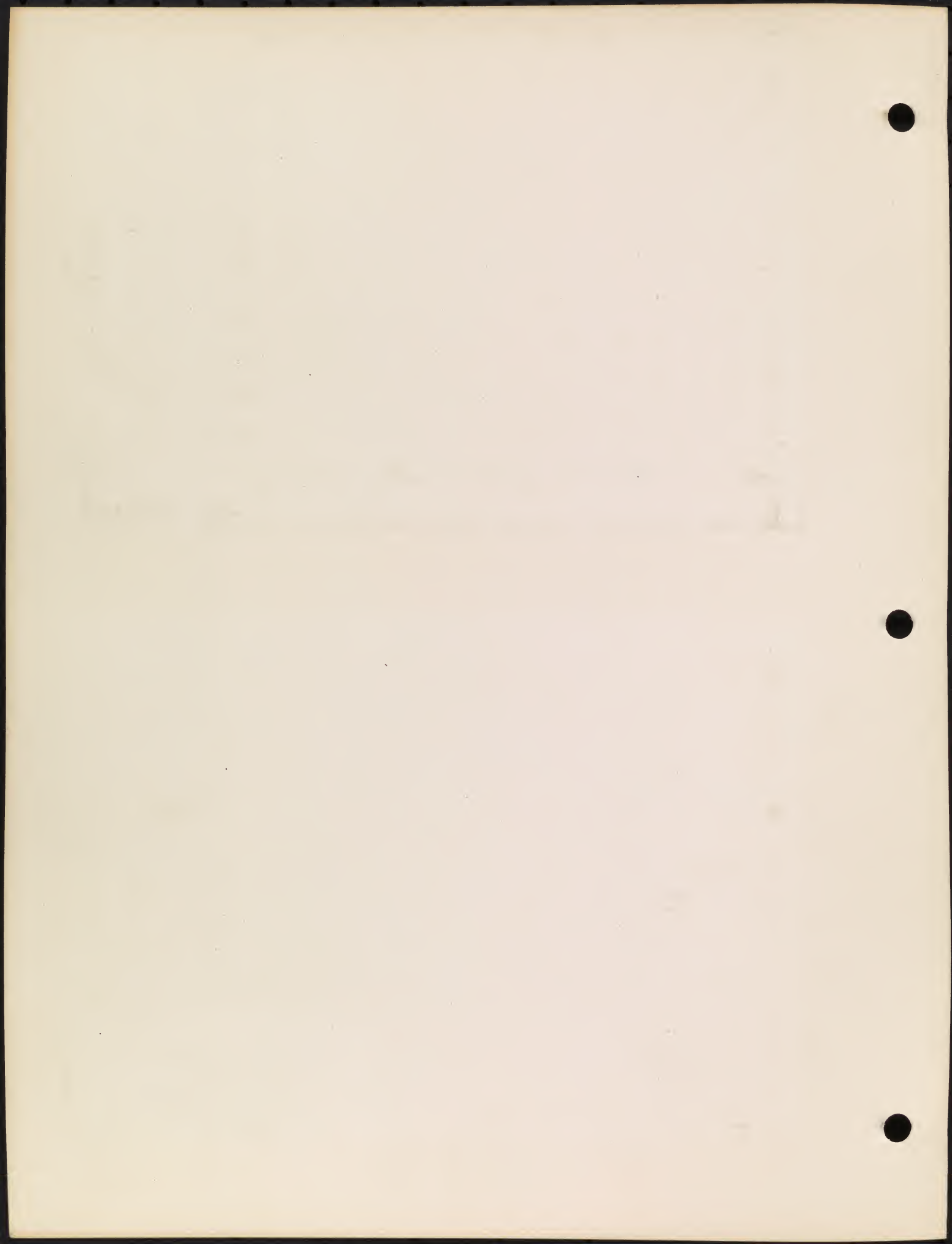




Plate LXXV. Large area of red and white oak killed by defoliation, at Red Hill, Moultonboro, New Hampshire, 1940.



Plate LXXVa. Typical scene from extensive defoliated area in Raymond, Maine, 1941, showing trees killed and injured trees including small pine in foreground.





Plate LXXVI. Large area of defoliated woodland at reservoir,  
Rockingham, Vermont, 1940.

p. 542

Plate LXXVla. Trees defoliated and killed.  
Note white pines in foreground.  
Simsbury, Connecticut. 1940.



p. 542

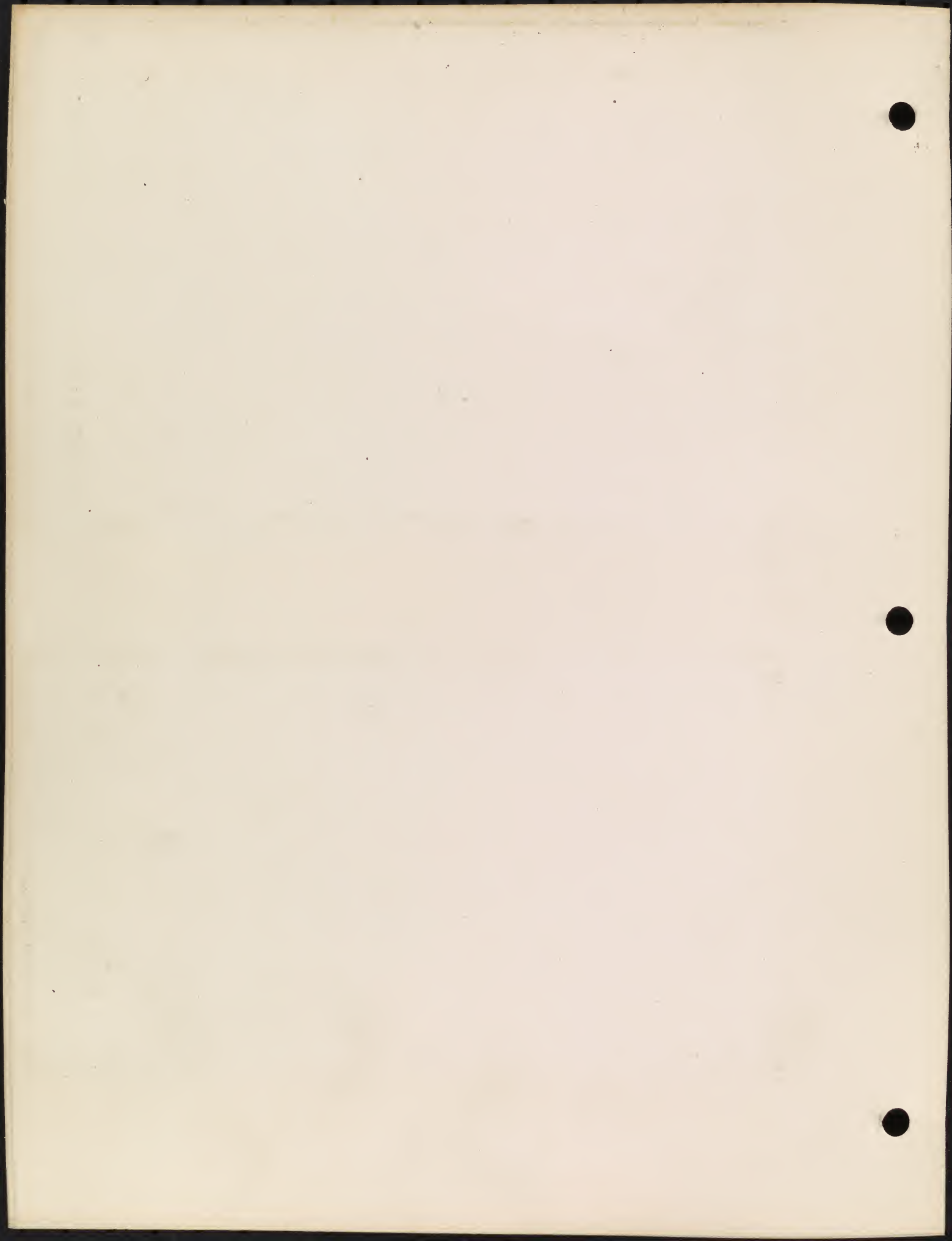




Plate LXXVII. Beech trees completely defoliated at Sandwich, Massachusetts, 1933.



Plate LXXVIIa. Gypsy moth feeding on mountain laurel.



Plate LXXVIIb. Egg clusters on leaves, Pelham, Massachusetts, 1935.

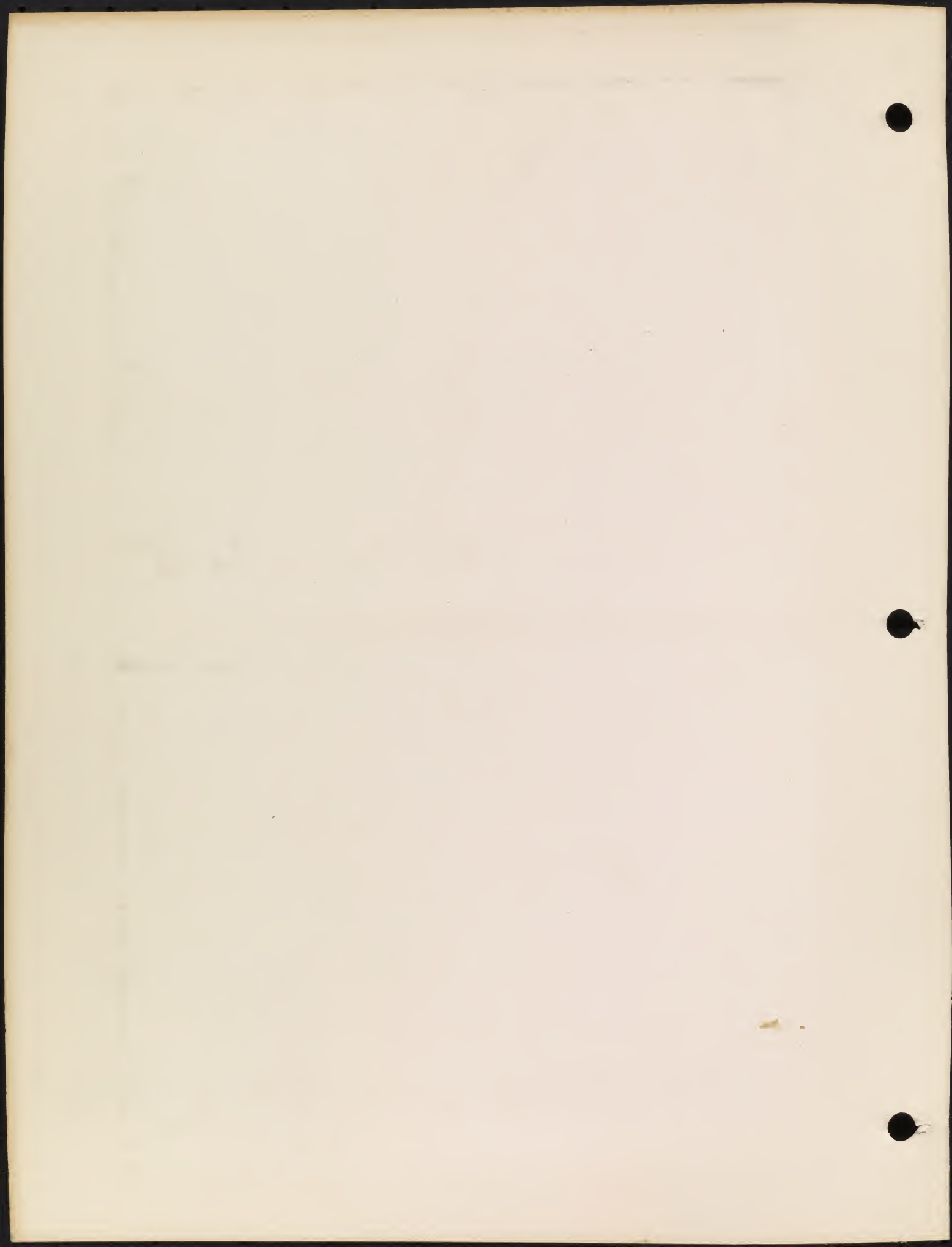




Plate LXXVIII. Hickory trees practically defoliated by gypsy moth. Petersham, Massachusetts, 1935.



Plate LXXVIIIa. Sugar maple and small red maple defoliated. Pelham, Massachusetts, 1935.





Plate LXXIX. Oak trees defoliated and young white pine killed by gypsy moth. Dedham, Massachusetts, 1937.



Plate LXXIXa. Red pine plantation killed by gypsy moth defoliation. Shawme State Forest, Sandwich, Massachusetts, 1932.

P. 543

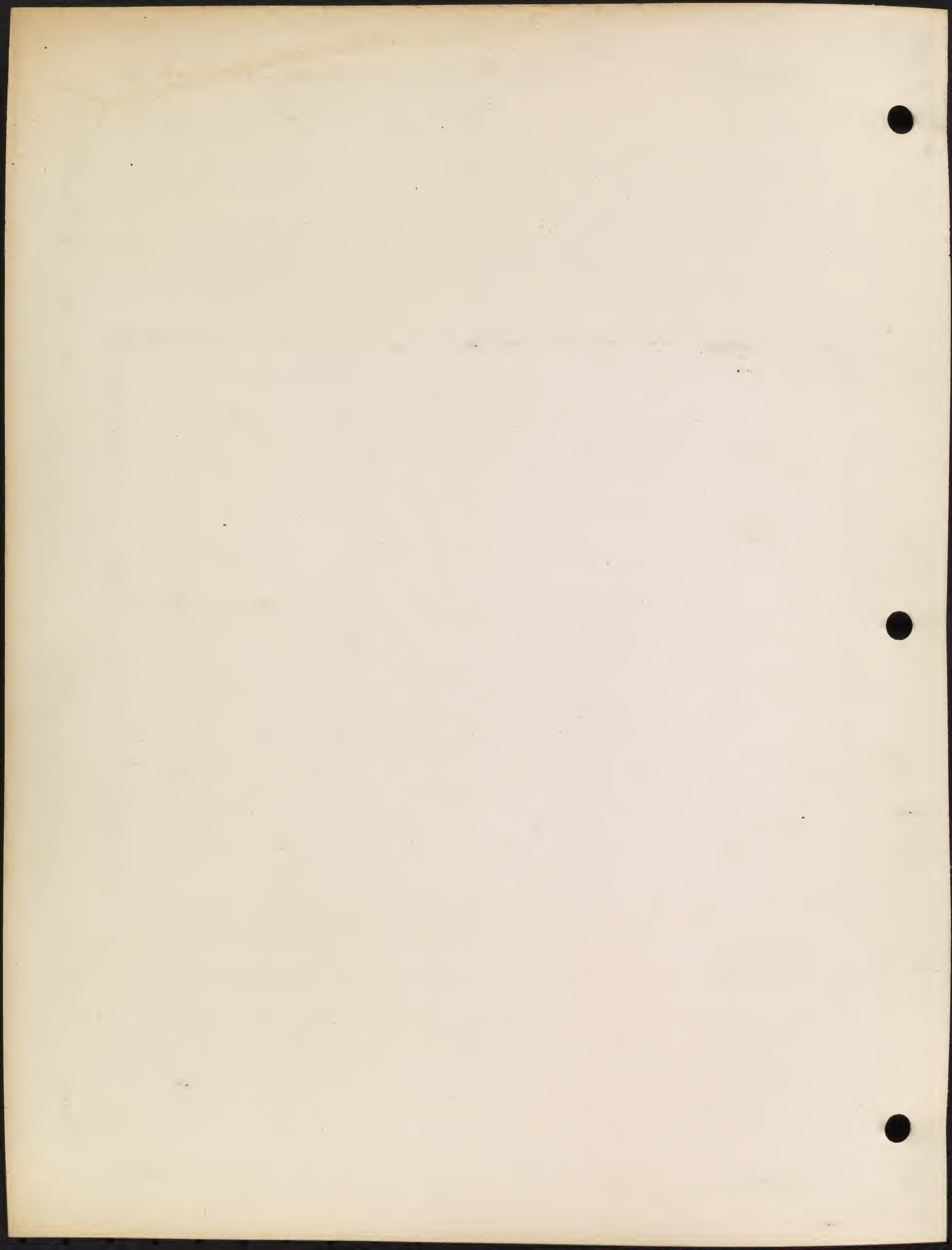




Plate LXXX. Larch trees defoliated by gypsy moth,  
Fall River, Massachusetts, 1932.



Plate LXXKa. Hemlock trees defoliated and killed,  
Athol, Massachusetts, 1935.



# GYPSY MOTH & BROWN-TAIL MOTH EXPENDITURES 1905 - 1942

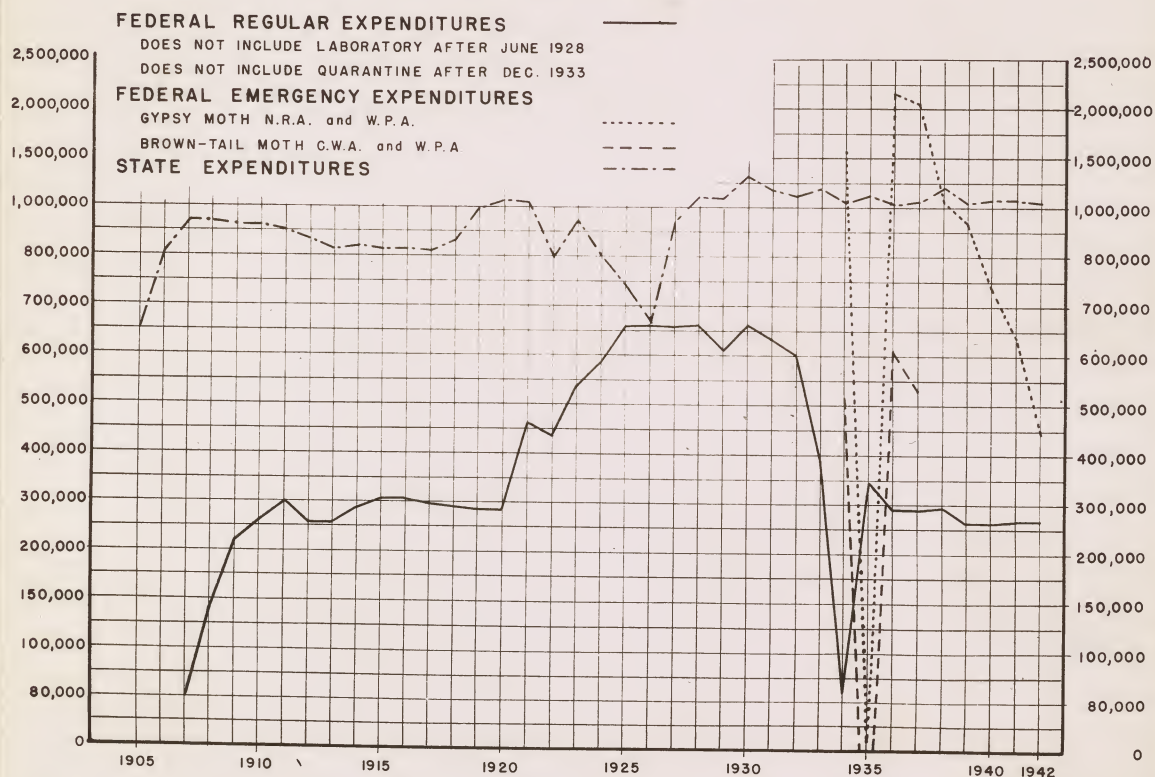


Plate LXXXI. Expenditures from 1905 to 1942, inclusive. Federal expenditures are shown by fiscal years and State expenditures by calendar years.

